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FOOD TECHNOLOGY ABSTRACTS

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Central Food Technological Research Institute, Mysore
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Phone : **0821-515850**
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E-mail : **fostis@cscftri.ren.nic.in**
fostis@nicfos.ernet.in

Contact Address:

H. Y. Mahakuteshwar
Head
FOSTIS, CFTRI,
Mysore – 570 013, India.

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National Information Centre For Food Science And Technology
Central Food Technological Research Institute,
Mysore - 570 013, India

Compiled & Edited by

B. Vasu

C. S. Anita

Abstractors to FTA

AA	Author's Abstract
BV	B. Vasu
CRG	C. R. Goud
CSA	C. S. Anita
GS	Geetha Seetharam
SD	S. Dhanaraj
SRA	S. R. Ananthnarayan

Computerisation and Database Creation

P. Manilal

C. S. Anita

B. Vasu

Production

S. Umesh

P. S. Ganesh Prasad

C. N. Janardhan

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FOOD TECHNOLOGY *ABSTRACTS*

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
°C	degree centigrade
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylene diamine tetraaceti acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10-15, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gr	gravity
gal	gallon
gf	gram-force
GLC	gas liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 1]
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycles/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcalk, kg]
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-	equivmilli-equivalent
M	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, etc
N	Normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	Poise
p	probability
Pa	pascal (N/M^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
resp.	respectively
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sol.	solution
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, µm]
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

ABBREVIATIONS FOR LANGUAGES

Language of text	
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	E
Swedish	Sv

1003

Hollingsworth (P). **Silicon chips: Food trend for the new millennium.** *Food Technology* 52(12); 1998; 54-55, 57

Discusses how computer technology is becoming the biggest factor in consumer food marketing-from food formulation to packaging and distribution. SRA

1004

Katz (F). **How major core competencies affect development of hot new products.** *Food Technology* 52(12); 1998; 46-50, 52

Companies are increasingly using core competencies to master market segments. Some technologies (rheology, a_w, particle analysis, lipid structure, carbohydrate technology, encapsulation, enzyme technology, antioxidant technology, nutraceuticals, food safety, packaging, flavour expertise) that add strength to core product competencies; products resulting from core competencies (low-fat meat products, fruit and vegetable products, coffee products, tea, chocolate, dairy products) and enhancing core competency are the aspects discussed. CSA

1005

Giese (J). **The food ingredients market in Japan.** *Food Technology* 52(12); 1998; 58-59

1006

Giese (J). **China's food industry and its market.** *Food Technology* 52(12); 1998; 60-61

1007

De (AM). **Towards food security through improved processed food products.** *Science and Culture* 64(3/4); 1998; 35-36

Reports the steps taken by the government, to promote food security through improved processed foods, viz., the formation of separate ministry at the centre, setting up of Agricultural and Processed Products Export Development Authority and the Horticultural Board. The role of CFTRI in promoting growth of food processing industries, by developing suitable technologies is discussed. The need for introducing total quality management, ISO - 9000 certification and good manufacturing practices is emphasised. GS

1008

Verma (SS) and Debnath (S). **Effects of processed food.** *Science and Culture* 64(3/4); 1998; 37-39

Aspects considered in this article include: factors influencing the use of processed foods, effects of processed food (safety risk, nutritional values, summary of health effect vs chemical additives, missing emotional link, and progaganda in favour of processed food) and wastes from processed food. It is concluded that judicious use of processed food is crucial with preventive measures against illness. 'Cook fresh and eat fresh' system should be followed in order to save health from many side effects associated with processed foods. BV

1009

Shah (BP), Shah (RK), Shah (US) and Marella (C). **Clean room ISO standards and their implications for Indian food industry.** *Indian Food Industry* 17(3); 1998; 154-157

1010

Anon. **Regional Conference on Food Fortification: Science, Technology and Policy held in Manila, Philippines, 3-5 December 1996.** *Food and Nutrition Bulletin* 19(2); 1998; 92-175

Papers presented at the conference include overview: Rationale and elements of a successful food-fortification programme by Darnton-Hill, I (pp. 92-100); Technical aspects of food fortification by Wirakartakusumah, M. A. and Hariyadi, P. (pp. 101-108); Food fortification: safety and legislation by Orriss, G. D. (pp. 109-116); Key economic issues by Popkin, B. M. (pp. 117-121); Foreign partnerships among industry, government, and academic institutions for food fortification by Maberly, G. F., Bagrinsky, J. and Parvanta, C. C. (pp. 122-130); Fortification of sugar with vitamin A by Pineda, O. (pp. 131-136); New issues in developing effective approaches for the prevention and control of vitamin A deficiency by Bloem, M. W.; De Pee, S. and Darnton-Hill, I. (pp. 137-148); Update on rice fortification in the the Philippines by Florentino, R. F. and Pedro, R. A. (pp. 149-153); History of fortification of margarine with vitamin A in the Philippines by Solon, F. S. (pp. 154-158); Iron and micronutrients: complementary food fortification by

Yeung, D. L. (pp. 159-163); Triple fortification of instant noodles in Thailand by Chavasit, V. and Tontisirin, K. (pp. 164-167); Multiple fortification of beverages by Barclay, D. (pp. 168-171); Fortification of salt with iodine by Chen, J. and Wu, H. (pp. 172-175). CSA

FOOD PROCESSING

1011
Farkas (J). **Irradiation as a method for decontaminating food: A review.** *International Journal of Food Microbiology* 44(3); 1998; 189-204

Review covers, assessment of dose requirements for radiation processing of foods for microbial safety, foods which are good candidates for radiation decontamination (poultry, egg products, red meats, fishery products), parasite disinfestation of foods of animal origin, radiation injury and increased sensitivity of the residual microflora surviving radiation treatment, limitations of food irradiation and status of legislation and future needs. Many references. SRA

FOOD PACKAGING

1012
Ozguler (A), Morris (SA) and O'Brien (WD). **Ultrasonic imaging of micro-leaks and seal contamination in flexible food packages by the pulse-echo technique.** *Journal of Food Science* 63(4); 1998; 673-678

1013
Simal-Gandara (J). **Selection of can coatings for different applications.** *Food Reviews International* 15(1); 1991; 121-137

This review comprises an up-to-date literature survey on the topic of food contact can coating. The need for can coatings, regulations of coatings for food contact, 3- and 2-piece cans, can corrosion, tinplate vs. Al, types of can coatings, canned foods (acidic and medium acidic products, sulphurating products), canned beer and carbonated beverages, area restricted lacquering or side-seam striping (inside/outside) and coating choice are the aspects included. 10 references. SRA

FOOD ENGINEERING AND EQUIPMENT

1014
Kapoor (BL). **Dehydration industry in India: status and constraints.** *Indian Food Packer* 52(5); 1998; 40-41

Constraints for the growth of dehydration industry, like non-availability of processing varieties of raw materials in adequate quantity; locational disadvantages; lack of machinery and product technology; high costs; and inconsistent market demand are identified. Efforts are needed to develop in-house R and D facilities; upgradation of plant and machineries to improve from the existing quality profile of dehydrated vegetables and to make the products available at an economical price both to the soup industry and domestic consumer. GS

1015
Mittal (GS). **Mass diffusivity of food products.** *Food Reviews International* 15(1); 1999; 19-66

Moisture diffusivity (D_m) and drying constants (K) of food products, raw and processed, are reviewed. The mass transfer properties were classified into various commodity groups such as fruits and vegetables (apple, apple puree, apricot, avacado, bananas, ber, carambola, cassava, chillies, garlic, grapes, hazelnut, hop, lime, mango, nutmeg, okra, onion, papaya, peas, pistachio nut meat, potato, tomatoes, walnut), cereals and oilseeds (barley, breakfast cereal, cashew kernel, corn, corn cobs, fibers, lentil, melon seed, paddy, pasta, peanut, rapeseed, rice, sorghum, soybean, starches, sunflower, toria, wheat, whitebran), meat and fish products (beef, minced beef, sausages, frozen fish flesh, shrimp), gels (model gels, sucrose and glucose, NaCl and isopropanol in gels), and other foods (skim milk, cheese). These properties were also reviewed for the foods during frying process. The methods to determine D_m and K are also discussed in brief. The data on the activation energy of diffusion (ΔH) process are summerized for various food products. Many of these properties are summarized in various tables. 179 references. SRA

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1016

Decker (EA). **Strategies for manipulating the prooxidative/antioxidative balance of foods to maximize oxidative stability.** *Trends in Food Science and Technology* 9(6); 1998; 241-248

Reviews the factors influencing the oxidative stability of foods; and various approaches to prevent oxidation reactions such as the removal of oxygen, free radical quenching, complexation or removal of prooxidant metals, control of prooxidative enzymes such as lipoxygenases and inactivation of intermediates of lipid oxidation. 49 references. GS

1017

Bell (LN), Touma (DE), White (KL) and Chen (Y-H). **Glycine loss and Maillard browning as related to the glass transition in a model food system.** *Journal of Food Science* 63(4); 1998; 625-628

The effects of a_w and the glass transition on the rate constants for glycine loss and brown pigment formation due to the Maillard reaction were evaluated in a model food system. Equimolar glucose and glycine were incorporated into amorphous polyvinylpyrrolidones of various mol. wt. and moisture contents. Glycine loss and brown pigment formation were quantified during storage at 25°C. At constant a_w, rate constants were higher in systems with lower glass transition temp. Glycine rate constants decreased upon matrix collapse, but browning rate constants were not affected by collapse. Changes associated with the glass transition influence bimolecular reactions and should be considered during product formulation and shelf-life testing. AA

1018

Witty (M). **New technologies for taste modifying proteins.** *Trends in Food Science and Technology* 9(7); 1998; 275-280

Reviews the state of the art of taste modifying sweet proteins like thaumatin, monellin, curculin, mabinlin and brazzein. Another protein miraculin is not sweet, but makes some foods taste sweet. Developments in the area of transgenic organisms, for the production of sweet proteins; and in genetic engineering, for improving the stability of sweet proteins are discussed. 41 references. GS

1019

Roa (V) and Tapia (MS). **Estimating water activity in systems containing multiple solutes based on solute properties.** *Journal of Food Science* 63(4); 1998; 559-564

A a_w model for multicomponent systems expressed as a linear first order sum of molalities and requiring only data from binary sol. was tested. The model was developed based on a linear relationship between a_w and molality for each solute. a_w Predictions were validated and compared with Ross' equation using a_w data reported of different complex electrolyte and nonelectrolyte sol. The equation proved to have a good predictive application, was extremely simple and exhibited comparable accuracy to Ross' equation in the mixtures considered. AA

Chemistry (Analytical)

1020

Charcosset (C). **Purification of proteins by membrane chromatography.** *Journal of Chemical Technology and Biotechnology* 71(2); 1998; 95-110

Adsorption chromatography is increasingly used for protein purification and medical applications. Synthetic membranes have advantages as support matrices in comparison to conventional bead supports because they are not compressible and they eliminate diffusion limitations. As a result, higher throughput and faster processing times are possible in membrane systems. In this paper, the various applications of membrane chromatography by focusing on affinity, ion exchange, hydrophobic interaction, reversed-phase and multistage chromatography are reviewed. The prospects of further development of membrane chomatography are discussed. AA

FOOD MICROBIOLOGY AND HYGIENE

Fermented foods

1021

Tamang (JP). **Role of microorganisms in traditional fermented foods.** *Indian Food Industry* 17(3); 1998; 162-167

Growth and activity of microorganisms such as filamentous fungi, yeasts and bacteria play an essential role in biochemical changes in the food substrates during fermentation. Biopreservation and bioenrichment of food substrates, microorganisms that produce enzymes, microorganisms that destroy undesirable component, enrichment of diet, mixed starter cultures and traditional fermented foods of medicinal value are the important aspects of microorganisms discussed. CSA

1022
Yoshizawa (K). **Sake: Production and flavour.** *Food Reviews International* 15(1); 1999; 83-107

A review with 37 references. SRA

Microorganisms

1023
Shimoda (M), Yamamoto (Y), Cocunubo-Castellanos (J), Tonoike (H), Kawano (T), Ishikawa (H), Osajima (Y). **Antimicrobial effects of pressured carbon dioxide in a continuous flow system.** *Journal of Food Science* 63(4); 1998; 709-712

The application of microbubbles of pressured CO_2 greatly increased CO_2 concn. in the sol. treated. By treatment at 6 MPa, 35°C and av. residence time 15 min, *Lactobacillus brevis* was completely inactivated at the level of dissolved CO_2, γ-greater than or equal to 11 (γ, Kuenen's gas absorption coeff.). *Eecherichia coli* and *Salmonella cerevisiae* required γ greater than or equal to 17, and *Torulopsis versatilis* required γ greater than or equal to 21 for complete inactivation. *Zygosaccharomyces rouxii* could be sterilized at 20 MPa and 26. A comparison of the continuous and batch method showed that *Lact. brevis* was inactivated completely under pressured CO_2 > 0.16 g/cm^3 with the continuous method and > 0.9 g/cm^3 with the batch method. AA

Bacteria

1024
Lucke (F-K) and Bosch (CT). **Advantages of and limits to application of the polymerase chain reaction (PCR) to detection and typing of foodborne pathogenic bacteria.** *Deutsche Lebensmittel-Rundschau* 94(6); 1998; 182-187 (De)

A brief cultural enrichment, followed by physical separation of the organisms from the culture and subsequent PCR using specific primers is a promising alternative to the conventional detection methods of pathogenic bacteria in foods. With limited workload, the method may provide confirmed results within 24 h without the necessity to routinely isolate pure cultures. Use of PCR without prior cultural enrichment is of interest in the detection of bacteria that are difficult to cultivate, and of nonculturable or nonviable forms. However, for wider application in laboratories of food microbiology, the sensitivity of the latter method is unsatisfactory. Moreover, the time and effort required to conc. and purify DNA from the samples makes it difficult to obtain the result within one working day. The PCR is an important tool to detect specific genes (especially, virulence genes) in pure cultures. Moreover, PCR-based typing methods have advantages (easily accessible reagents, few if any untypable strains) over typing methods based on phenotypic properties, and may thus assist in tracing back hygienically relevant organisms through the production chain. However, the reproducibility of electrophoretic patterns is a problem, particularly with the RAPD method. The methods described differ in their discriminatory power and the choice of a typing method (be it PCR-based or "conventional") is difficult because it must be based on the degree of genetic homogeneity and stability of the sp. or subsp. to be typed. AA

Fungi

1025
Radzio (R) and Kuck (U). **Synthesis of biotechnologically relevant heterologous proteins in filamentous fungi.** *Process Biochemistry* 32(6); 1997; 529-539

Numerous eukaryotic expression systems have been developed for use in filamentous fungi since these microorganisms have a high capacity for protein production and secretion. Although commercial exploitation is still at an early stage, a greater understanding of post-translational protein modification and protein secretion mechanisms might help optimize large scale heterologous protein production systems. This is of particular relevance to those proteins that cannot be produced in sufficient quantities in other expression systems. Here, recently developed systems for synthesizing foreign polypeptides in filamentous fungi are

reviewed, paying particular attention to the mol. aspects of regulating heterologous gene expression in different hosts. The application of such technology to pathway engineering and protein over-production was also evaluated. AA

Yeasts

Kluyveromyces marxianus

1026

Belem (MAF) and Lee (BH). **Production of bioingredients from *Kluyveromyces marxianus* grown on whey: An alternative.** *CRC Critical Reviews in Food Science and Nutrition* 38(7); 1998; 565-598

Whey waste is a major problem for the dairy industry. Finding an alternative means to reduce its pollution potential and produce high value-added bioingredients has been attempted. Thus, anaerobic and aerobic fermentation of cheese whey by *Kluyveromyces marxianus* var. *marxianus* has been proposed as a treatment to reduce whey pollution potential and to produce: (1) single cell protein; (2) enzymes such as polygalacturonase or carboxypeptidase; (3) biomass; and (4) ethanol in batch, in single-stage continuous fermentation with 100% cell recycle, and in packed-bed type columns. The relevance of these factors on yeast fermentation of whey is summarized in this critical review. 110 references. SRA

Saccharomyces cerevisiae

1027

Stoll (A) and Cuncan (JR). **Comparison of the heavy metal sorptive properties of three types of immobilized, non-viable *Sachharomyces cerevisiae* biomass.** *Process Biochemistry* 32(6); 1997; 467-472

Three preparations of immobilized, non-viable *Saccharomyces cerevisiae* were produced and tested with respect to their metal accumulating properties and mechanical stability. The biomass preparation PVA Na-alginate, PVA Na-orthophosphate and PEI:GA biomass all exhibited excellent mechanical stability. In contrast, the ability of the PEI:GA biomass to remove Cu^{2+} from sol. exceeded that of the PVA based biomass. Due to the ion exchange nature of metal biosorption, Cu^{2+} accumulation from the effluent was influenced by the pH of the influent sol. A low influent pH (pH 1.4) resulted in low breakthrough vol. occurring, whilst this critical point was increased at higher influent pH. AA

BIOTECHNOLOGY

1028

Buch (GW) and Berger (RG). **Biomimetic stabilisation of chlorophylls for food use.** *Deutsche Lebensmittel-Rundschau* 94(5); 1998; 143-148 (De)

Chlorophylls and pheophytins were stably adsorbed in pigment/protein ratios from 0.321 to 0.383 (g/g) onto apohemoglobin. While chemically derivatised apohemoglobins did not yield improved adsorbates, a partially hydrolysed apohemoglobin preparation showed high pigment loading of 0.28 w/w (corresponding to about 20 mol of porphyrin/mol of apohemoglobin), good water solubility, and a very weak solubility min. at the pI. The adsorbate was immediately incorporated into more colour-stable foods. Its half life was about 6 times longer than colloidal chlorophyll. AA

TISSUE CULTURE

Nil

FOOD ADDITIVES

Antimicrobials

1029

Shofran (BG), Purrington (ST), Breidt (F) and Fleming (HP). **Antimicrobial properties of sinigrin and its hydrolysis products.** *Journal of Food Science* 63(4); 1998; 621-624

Colourants

1030

Goyle (A) and Gupta (RG). **Use of synthetic colours in foods.** *Science and Culture* 64(11/12); 1998; 241-243

CEREALS

1031
Nkama (I) and Malleshi (NG). **Production and nutritional quality of traditional Nigerian masa from mixtures of rice, pearl millet, cowpea and groundnut.** *Food and Nutrition Bulletin* 19(4); 1998; 366-373

Studies were conducted to assess the feasibility of supplementing millet or rice with grain legumes for *masaA* (a Nigerian yeast-fermented puff batter of millet or rice cooked in a pan with individual cuplike depressions) preparation. Based on a least-cost computer programme, *masa* formulations containing millet or rice blended with cowpea or groundnut were prepared and their chemical and nutritional qualities were evaluated. P and Ca concn. were low and Mg and Na concn. were high. Significant improvements in lysine (9-75%), threonine (16-25%) and isoleucine (10-28%) were observed for some *masa* samples. The biological value (81-93%), apparent digestibility (82-85%) and net protein utilization (74-79%) of all *masa* samples showed improved nutritional qualities. Supplemented *masa* was nutritionally better than *masa* made from millet or rice alone. CSA

1032
Mandal (RK). **Biotechnology for improvement of nutritional quality and processing of cereals.** *Science and Culture* 64(3/4); 1998; 40-43

Application biotechnology for the improvement of nutritional quality and post-harvest processing of rice, wheat, maize and barley is discussed. In all these cereals the quality is limited by the quantitative composition and properties of grain storage proteins and carbohydrates. A combination of biochemical, physicochemical and molecular studies has led to the understanding of the molecular basis of nutritional, cooking, breadmaking or malting quality in appropriate cases. Genes encoding key quality-determining proteins have been cloned and regulation of their expression studied in transgenic plants. In the preharvest technology area, genes for better yield and other agronomic traits like disease and pest resistance, herbicide tolerance, stress tolerance etc. have been the targets. Due to economic gains that the opportunities in vast array of biotechnology to bring a quantum jump by incorporation of genetically engineered food quality traits into crops including cereals is expected in future. GS

Breakfast cereals

1033
Ferriola (D) and Stone (M). **Sweetener effects on flaked millet breakfast cereals.** *Journal of Food Science* 63(4); 1998; 726-729

Oats

1034
Yokoyama (WH), Knuckles (BE), Stafford (A) and Inglett (G). **Raw and processed oat ingredients lower plasma cholesterol in the hamster.** *Journal of Food Science* 63(4); 1998; 713-715

The objective of this study was to determine if oatrim, a product developed for use as a fat substitute, could also reduce plasma cholesterol due to its soluble dietary fiber content. Diets with soluble fiber contents of 0% (oat hydrolyzate) or 4.2-4.3% β-glucan from oat or Oatrim were fed to hamsters for 21 days. All oat derived diets reduced serum cholesterol compared to a control diet containing cellulose (P less than or equal to 0.05). The available carbohydrate produced by the Oatrim process correlated inversely (r^2 = 0.95) with low density lipoprotein cholesterol concn. AA

MILLETS

1035
Akubor (PI) and Obiegbuna (JE). **Certain chemical and functional properties of ungerminated and germinated millet flour.** *Journal of Food Science and Technology (India)* 36(3); 1999; 241-243

Ungerminated millet flour (UGMF) and germinated millet (*Pennisetum typhoidium*) flours (GMF) were prepared and evaluated for certain chemical and functional properties. Germination resulted in significant decreases ($P < 0.05$) in fat and carbohydrate contents and significant increases in crude proteins and crude fibre. Water absorption capacity and bulk density of flour samples decreased significantly ($P < 0.05$) with increased length of germination. Germination increased foam capacity and decreased foam stability. GMF flour produced 45 and 53% increases in emulsion activity

and stability, resp. over UGMF. GMF may have increased utility in food system rather than UGMF. AA

1036

Agu (RC) and Palmer (GH). **The effect of temperature on the modification of sorghum and barley during malting.** *Process Biochemistry* 32(6); 1997; 501-507

Comparative studies of germinated sorghum and barley revealed that both cereals developed similar levels of hydrolytic enzymes especially when assessed as total amylolytic activity (diastatic power). The low level of α-amylase reported for sorghum is due to the assay procedure and may reflect differences in the properties of respective amylases. High germination temp. increased rootlet growth and β-amylase development in both sorghum and barley malts. It also increased the α-amylase, total soluble nitrogen and extracts developed in sorghum malt but not in barley malt. In both sorghum and barley, α-amino nitrogen levels were depressed as the germinating temp. was raised. The peptide release pattern of germinated sorghum and barley were similar at high and low temp. AA

Corn

1037

Castelo (MM), Katta (SK), Sumner (SS), Hanna (MA) and Bullerman (LB). **Extrusion cooking reduces recoverability of fumonisin B_1 from extruded corn grits.** *Journal of Food Science* 63(4); 1998; 696-698

A split-split plot design was used to determine the effects of extrusion cooking on the recoverability of the mycotoxin fumonisin B_1 (FB_1). Unextruded and extruded samples of spiked corn grits were analyzed for FB_1 by 2 methods, commercial enzyme linked immunosorbant assay (ELISA) and HPLC. Extrusion cooking resulted in more apparent loss of FB_1 with mixing screws than nonmixing screws. Losses of recoverable FB_1 (P less than or equal to 0.05) were observed at 120°C and 160°C with the mixing screws. A linear increase in loss of recoverable FB_1 was observed (with the nonmixing screws) as the moisture content increased. AA

Sorghum

1038

Elkhalifa (AEO) and Tinay (AHE). **Effect of germination on protein fractions and assayable tannins of low- and high-tannin sorghum cultivars.** *Journal of Food Science and Technology (India)* 36(3); 1999; 250-252

Two sorghum cvs., 'Dabar 1-1' (low tannins - 0.240%) and 'Cross 35:18' (high tannins - 1.162%) were studied for changes in protein fractions and tannins during germination. The percentages of protein fractions for 'Dabar 1-1' were: albumin 22.7%, globulin 15.2%, prolamins 35.0%, glutelins 15.1% and residues 11.9% and were 10.0, 4.7, 67.9, 9.4 and 8.1% resp. for 'Cross 35:18' cv. The tannin contents of the protein fractions for the 'Dabar 1-1' cv. were 0.148, 0.040, 0.012 and 0.040% for the 4 fractions, resp., while for the 'Cross 35:18' cv., the corresponding values were 0.367, 0.056, 0.136 and 0.536%. The 2 cvs. were soaked in water for 10 h, germinated for upto 72 h and the protein fractions and their tannin contents were determined at 24 h intervals. A significant (P less than or equal to 0.05) increase in the albumin fraction for both sorghum cvs. occurred during germination. The tannin content for the low tannin cv. fluctuated during germination, whereas for the high tannin cv., the tannin contents of the albumin globulin, prolamin and glutelin fractions decreased by 68, 28, 50 and 87%, resp. AA

1039

Shazali (MEH) and Ahmed (MA). **Assessment and reduction of losses in sorghum stored in traditional mud bins in Sudan.** *Tropical Science* 38(3); 1998; 155-160

Sorghum was stored for 8 months in traditional sweibas (cylindrical mud bins) and in sweibas improved in 5 ways: by narrowing the top opening; by covering the opening with a tight-fitting lid; by providing a chute at the bottom for discharge; by sealing the inside surface; and by raising the platform support. Bagged sorghum was kept in a brick store for comparison. Insect numbers and damage increased in all the treatments, but they were significantly lower in the improved sweibas. By the end of the storage period losses were 2.23% in the improved sweibas, 4.42% in traditional sweibas and 8.34% in bags. AA

PULSES

Beans

1040

Czarnecka (M), Czarnecki (Z), Nowak (J) and Roszyk (H). **Effect of lactic fermentation and extrusion of bean and pea seeds on nutritional and functional properties.** *Die Nahrung* 42(1); 1998; 7-11

Controlled lactic acid fermentation of "Bomba" bean and "Opal" pea was used to improve their nutritional and functional properties. The modified legumes were used as a source for extrusion process to obtain snack-type foods. Milled legume seeds were fermented by different population of *Lactobacillus plantarum* with different moisture content in plant material to estimate the influence of this two parameters on the dynamics of lactic fermentation. Quantitative and qualitative changes in carbohydrates and nitrogen compounds of modified seeds were analyzed (e.g. mono- and oligosaccharides, *in vitro* starch and protein digestibility). In the new snack-type products, functional properties: water solubility index (WSI), water absorption index (WAI), expansion index, bulk density and texture explained as a shearing stress were recorded. Results showed a distinct decrease in raffinose, verbacose and stachyose contents even up to 80-90% after fermentation and extrusion process. Lactic fermentation and extrusion of bean and pea seeds contributes to a significant (α less than or equal to 0.05) increase of *in vitro* protein and starch digestibility. Observations of changes in functional properties of extrudates (e.g., expansion, shearing stress, WSI, WAI) allowed to choose the most efficient model of fermentation pretreatment to obtain the best improvement of nutritional and functional features of the product. AA

Chickpeas

1041

Singh (U), Burridge (P) and Clark (J). **Dehulling quality and cooking time of Australian chickpeas.** *Journal of Food Science and Technology (India)* 36(3); 1999; 270-272

An interlaboratory comparison was carried out to study the dehulling quality and cooking time of chickpeas grown in Australia. Results indicated considerable consistency in *dhal* yield of genotypes determined by different laboratories. *Dhal* yield of 'T-1315' was the highest, followed by 'T-1414'. The cooking time of genotypes ranged between 95 and 135 min for whole seed samples and between 32 and 48 min for *dhal* samples. Since India imports considerable amounts of chickpea to meet its domestic demands, it is suggested that chickpeas with 75% *dhal* yield potentials and about 90-100 min cooking time of whole seeds and 35-40 min cooking time of *dhal* samples be preferred and encouraged for import. AA

Peas

1042

Madhukara (K), Srilatha (HR), Srinath (K), Bharathi (K) and Nand (K). **Production of methane from green pea shells in floating dome digesters.** *Process Biochemistry* 32(6); 1997; 509-513

1043

Dudek (S), Gueguen (J), Krause (J-P) and Schwenke (KD). **Functional properties of the α-chain of a major legumin subunit of *Pisum sativum* legumin.** *Die Nahrung* 42(1); 1998; 2-6

The constituting polypeptides of a heavy pea legumin subunit were separated. The interfacial and emulsifying properties of the α-chains were studied and compared with those of the respective subunit and the native legumin molecules. The α-polypeptides show modified interface behaviour as compared to the legumin. Faster diffusion and higher adsorption barriers during the phase of rearrangement, higher interface coverage in the equilibrium state and improved emulsifying properties were measured. AA

OILSEEDS AND NUTS

Coconuts

1044

Ganesan (V) and Gothandapani (L). **Microstructure of spray-dried and partially defatted coconut skim milk powder.** *Journal of Food Science and Technology (India)* 36(3); 1999; 268-269

The microstructure of coconut skim milk powder was observed using Scanning Electron Microscopy (SEM). Small surface folds and cracks were noticed in some particles, whereas many samples contained small depressions resembling the surface of moon. The surface of particle looked like honeycomb structure. Some of the particles were more wrinkled and curly. AA

1045

Berginski (R), Pareth (G) and Brunn (W). **Microbiological investigations of dessicated coconut.** *Deutsche Lebensmittel-Rundschau* 94(7); 1998; 211-214 (De)

Soybeans

1046

Dhaliwal (YS) and Aggarwal (RAK). **Composition of fat in soybeans as affected by duration of germination and drying temperature.** *Journal of Food Science and Technology (India)* 36(3); 1999; 266-267

Soybeans of var. 'Shivalik' and 'Punjab No. 1' were soaked in water for 6 h followed by germination for 36 and 48 h at 35°C. After requisite germination, the germinated samples were divided into 2 lots. One lot was dried at low temp. (30°C) and other at higher temp. (70°C) in tray driers. The germinated and dried samples were dehulled and milled to flour fineness. The fat content of soybeans decreased with increase in germination time. Free fatty acid content also decreased with increase in germination time. Oleic acid level first decreased with 36 h germination and thereafter, an increase was noticed after 48 h of germination. Similar results were recorded for linolenic acid. Oleic and linoleic acid contents were higher in germinated soybeans dried at low temp. Between tested var., fat, oleic acid and linoleic contents were higher in var. 'Shivalik'. AA

Soy products

Soy lecithin

1047

Wurz (A), Ruggeberg (H), Waiblinger (HU) and Pietsch (K). **DNA extraction method for the detection of genetically modified soy in soy lecithin.** *Deutsche Lebensmittel-Rundschau* 94(5); 1998; 159-161 (De)

Lecithins derived from soybeans can be found in a broad spectrum of different types of food, ranging from bakery products to antioxidants, stabilizer and emulgators. Soy lecithins consist not only of the choline phosphatide but also e.g. neutral fats, glycolipids and fragments of the soybean DNA. In 1996 approx. 2% of all US soybeans were of transgenic origin (the so called Glyphosate resistant Roundup Ready Soybean). For surveillance the Novel Food legislation as well as for regards of consumer informations a reliable scientific test to prove a genetically modified organism origin become more important. To respond to this situation, a DNA extraction method for the isolation of small amounts of soybean DNA from soy lecithin has been developed. The DNA extraction method was tested in 4 lab. with 6 different solid and liquid lecithins. The presence of soy DNA was determined with a primer pair yielding a fragment amplified from the soy lectin gene. Transgenic soy was determined with a primer pair specific for the Roundup ready soybean. In all 4 lab. soybean specific DNA was extractable from all samples using the described extraction method. AA

Tempeh

1048

Tawali (AB) and Schwedt (G). **Change of iron-species during processing of soybeans to its fermented product *tempeh*.** *Die Nahrung* 42(1); 1999; 29-31 (De)

The change of distribution of Fe-sp. and the Fe availability during processing of soybean to its fermented product *tempeh* were investigated. The results demonstrated that the distribution of Fe in various Fe-sp. in soybean remained unchanged during soaking. During cooking and steaming, the soluble part of Fe decreased. The percentage of Fe(III) and complexed Fe-sp. increased at the expense of Fe(II) sp. During fermentation the soluble Fe increased, the percentage of Fe(III)-sp. and complexed Fe decreased whereas Fe(II) sp. increased again. Based on the detn. of the soluble Fe content after the extraction of the sample using simulated digestive juices (gastric and intestinal juice), it can be established that the Fe availability remained unchanged during soaking, decreased during cooking and steaming and increased through fermentation. AA

1049

Heskamp (M-L) and Barz (W). **Expression of proteases by *Rhizopus* species during *tempeh* fermentation of soybeans.** *Die Nahrung* 42(1); 1999; 23-28

Expression of proteolytic activities by nine *Rhizopus* strains during soybean fermentation to produce *tempeh* has been determined. All strains showed activity at acidic, neutral, and alkaline pH values. In protein solubilizates prepared from *tempeh* pronounced differences in the time course and intensity of max. protease activities were observed between the isolates when measured at pH 7, the approx. pH of *tempeh* during ripening. Proteases expressed by fungi during growth on *tempeh* were solubilized and the enzymes were enriched by acetone precipitation and chromatographies with phenylsuperose, Mono S, and Mono P, resp. They were identified as one aspartic- (~35 kD) and one serine (~33 kD) protease, each existing in different isoforms. Proteases isolated from *tempeh* were identical to those expressed during fungal growth in a soy protein-raffinose-phytate liquid medium. The temp. stability of the *tempeh*- and the cell wall-isolated proteases is very low in contrast to the proteases secreted into the medium. Proteases isolated from *tempeh*, cell walls and liquid media exhibit differences in the number of alkaline isoforms. AA

Soy proteins

1050

Potter (SM). **Soy protein and cardiovascular disease: The impact of bioactive components in soy.** *Nutrition Reviews* 56(8); 1998; 231-235

Soy protein, when substituted for animal protein in the diet, will lower blood cholesterol. Recent research also provides evidence that soy protein and/or isoflavones may improve endothelial functioning and attenuate events leading to both lesion and thrombus formation. Review. 43 references. AA

TUBERS AND VEGETABLES

Vegetables

1051

Ramaswamy (HS) and Grabowski (S). **Fastest velocity particle in tube flow: Single -vs. multi-particle approach.** *Journal of Food Science* 63(4); 1998; 565-570

Velocities of particles (carrot, parsnip, potato, and nylon) of different sizes ($d_p/D = 0.25$-0.5) and shapes (spheres, cylinders and cubes) were evaluated in a transparent holding tube (L = 3.8 m and D = 0.05 m) with water and water/pectin (up to 1.2%) sol. as carrier liquids (T = 20-80°C). Particles were introduced individually or in groups of 2-135, and evaluated with respect to a given type, shape, size and concn. Results showed that, when densities of particle and liquid were different, the fastest traveling particle in a multi-particle system was the largest sphere traveling alone in the carrier liquid of highest velocity and viscosity. Conservative values of critical particle velocities were obtained by using the single particle approach. AA

Bitter gourd

1052

Chang (M-K), Chapital (DC), Conkerton (EJ), Wan (PJ), Vadhwa (OP), Spiers (JM). **Comparison of the fruit from four cultivars of Chinese melon (*Mordica charantia* L.).** *Tropical Science* 38(3); 1998; 128-133

Cassava

1053

Akpan (I), Ikenebomeh (MJ) and Doelle (HW). **Glutamic acid production from cassava whey by *Brevibacterium* sp. G012.** *Tropical Science* 38(3); 1998; 147-150

Amylase from a *Rhizopus* sp. grown on rice bran hydrolysed cassava whey to fermentable sugars at 72.5% efficiency. A one-step fermentation of whey hydrolysate gave a low yield of glutamic acid with both *Brevibacterium* sp. G012 and *Corynebacterium glutamicum*. In a two-step process, the yield was 9.7-9.8 mg/ml with both bacteria after 36 h. Whey sugars at 3% and urea as N-supplement enhanced the yield from G012 to 11.2 mg/ml after 36 h. SRA

1054

Muzanila (YC), Brennan (JG) and King (RD). **Effect of drum speed and pre-cooking on nutritional value of cassava flakes.** *Tropical Science* 38(3); 1998; 134-137

Drum-dried cassava flakes were produced with different pre-cooking temp. and drum speeds. Pre-cooking was at 75°C for 35 min and 100°C for 5 min and the drum speeds were 11.5 and 14.0 rpm, corresponding to 4.0 and 3.4 s drying time resp. Pre-cooking affected vitamin C, moisture and starch content, while drum-speed affected only the moisture content of the flakes. The longer pre-cooking caused losses in vitamin C, while the higher temp. increased the free starch content. The moisture content increased with the drum speed. AA

Leafy vegetables

Lucerne

1055

Mungikar (AM). **A comparison of methods for preparing leaf protein concentrate (LPC) from lucerne (*Medicago sativa* L.).** *Science and Culture* 64(9-10); 1998; 231

Leaf protein concentrate (LPC) from leaf juice of lucerne (*Medicago sativa* L.) was prepared by 3 methods viz., heat coagulation (HC), acid coagulation and fermentation. The crude protein(52.38%), Ca(1.86%) and P(0.52%) content were max. in the LPC prepared by HC method. GS

Okra

1056

Camciuc (M), Bessiere (JM), Vilarem (G) and Gaset (A). **Volatile components in okra seed coat.** *Phytochemistry* 48(2); 1998; 311-315

The volatile in the coat of okra seeds can be released by simple rubbing of the compound seeds. They were isolated by hexane extraction and steam distillation to give the essential oil (EO) and by head space (HS) condensation. 72 compounds were identified in the study (40 esters and 24 sesquiterpenes and derivatives). The most abundant compound was 2-methylbutyl-2-methylbutanoate which represented 49.6% of the HS and 32% of the EO. Among the sesquiterpenes, germacrene D (11.9% of the EO) and the farnesyl derivatives (7.9% of the EO) were the major compounds. Most of these compounds have not been reported previously to be present in okra. AA

Potatoes

1057

Thybo (AK), Martens (HJ) and Lyshede (OB). **Texture and microstructure of steam cooked, vacuum packed potatoes.** *Journal of Food Science* 63(4); 1998; 692-695

1058

Koniger (M) and Wallnofer (PR). **Fate of sprout inhibitors propham (IPC) and chlorpropham (CIPC) in potatoes in relation to different cooking techniques.** *Deutsche Lebensmittel-Rundschau* 94(7); 1998; 279-231 (De)

The effects of various methods of cooking on distribution of the sprout inhibitors propham (IPC) and chlorpropham (CIPC) in potatoes were studied. After application of IPC as a powder or CIPC by aerosol the potatoes were stored for 4-5 months. The HPLC-analysis of the washed raw potatoes showed that 96.8% of IPC and 89.4% CIPC residues was removed by peeling. Three methods of cooking (boiling, pressure cooking, and frying in Al foil) resulted in different penetration of IPC and CIPC into the inner tissue. AA

1059

Gopalan (HS), Pendharkar (MB), Subbulakshmi (G) and Padwal-Desai (SR). **Application of sodium erythorbate in controlling browning of diced potatoes.** *Journal of Food Science and Technology (India)* 36(3); 1999; 226-234

The mechanism for the prevention of enzymatic browning by the antioxidant sodium erythorbate was investigated using the oxidative reaction catalyzed by polyphenol oxidase (PPO), isolated from potato tuber on p-cresol, pyrocatechol and the mixture of natural substrates isolated from potato tuber tissue. Sodium erythorbate showed no inhibitory action on PPO activity. On the contrary, the activity enhanced slightly. *In vitro* experiments in PPO assay system, the antioxidant totally inhibited the brown colour formation even though the oxygen consumption was not changed. The prevention of browning was due to reduction of the quinones formed in the enzymatic reaction back to original phenolic compounds by sodium erythorbate. The factors influencing the stability and antioxidant ability of sodium erythorbate were studied. A practical method has been devised for the prevention of browning of potato slices by using a sol. containing 1000 ppm sodium

erythorbate in 0.02 M citric acid sol. adjusted to pH 4-6 as an anti-browning mixture. AA

1060

Marwaha (RS), Devender Kumar and Gaur (PC). **French fry quality of some advanced potato hybrids.** *Indian Food Packer* 52(5); 1998; 11-15

Six advance stage potato hybrids viz. 'JEX/C -166', 'JH-222', 'MP/91-G', 'MP/91-76', M'P/92-30' and 'PJ-376' along with two var., 'Kufri Chandramukhi' and 'Kufri Jyoti' taken as control were evaluated for processing into French fries and certain important physico-chemical characters of the tubers influencing the processing were investigated. Dry matter content of the advanced hybrids varied between 17.1-22.1% as against 18.6-18% in controls. The reducing sugar content of the advanced hybrids was lower (112-245 mg/100 g for wt). Glucose was main reducing sugar in all the cvs. The contents of phenolic compounds were also lower in the advanced hybrids as compared to control var. Freshly prepared fries from 'JEX/C-166', 'MP/92-30' and 'PJ-376', and 'Kufri Jyoti' were unacceptable in colour and flavour. Yield recovery on fresh wt. basis ranged from 40.9-48.9% in advanced hybrids as against 44.7-48.2% in control var. Three advanced viz. 'MP/91-G',d hybrids as against 44.7-48.2% in control var. Three advanced hybrids viz. 'MP/91-G', 'MP/91-76' and 'JH-222' were found to be suitable for processing into French fries. However, based on colour, texture, flavour and yield of French fries, 'MP/91-G' was considered the best. AA

Sweetpotatoes

1061

Truong (VD), Walter (WM) and Bett (KL). **Textural properties and sensory quality of processed sweetpotatoes as affected by low temperature blanching.** *Journal of Food Science* 63(4); 1998; 739-743

Sweetpotatoes (SP) stored for 9-12 months after harvest were cut into cylindrical pieces and, following factorial experiments and response surface design, were blanched at 50-80°C for 15-274 min. Instrumental textural properties were measured by uniaxial compression and texture profile analysis. Samples of selected blanching treatments were canned in syrup for textural and sensory evaluations. Both blanching temp. and time had significant effects on firmness. Optimal temp. for maximal firmness retention was about 62°C. For canned SP, the 62°C blanched samples were more intact (2-3-fold) and firmer (2-7-fold) than controls. Sensory texture and overall acceptability were greatest for samples blanched at 62°C for 30 or 45 min before canning. AA

Tomatoes

1062

Nyalala (SPO) and Wainwright (H). **The shelf-life of tomato cultivars at different storage temperatures.** *Tropical Science* 38(3); 1998; 151-154

The shelf-life of a fresh market tomato cv. (Money Maker) and a processing tomato cv. (Cal-J) at 4.5°C, room temp. (18-25°C) and 30°C was studied. The wt. loss was significantly higher at increased temp. and there was an interaction between the var. and room temp. and 30°C. Loss in fruit firmness was greatest at the 2 higher temp. but there were no significant differences between the cvs. The difference in shelf-life was highly significant between temp. levels and the cvs. Money Maker had longer shelf-life than Cal-J under all conditions, but storage temp. rather than cv. difference was the major factor determining shelf-life. AA

1063

Hayes (WA), Smith (PG) and Morris (AEJ). **The production and quality of tomato concentrates.** *CRC Critical Reviews in Food Science and Nutrition* 38(7); 1998; 537-564

The standards and specifications for the quality and composition of tomato conc. (TC), rheological measurements on both tomato juice and TC and attempts to develop objective methods as a substitute for sensory assessment are reviewed. 71 references. SRA

1064

Sogi (DS), Kiran (J) and Bawa (AS). **Characterization and utilization of tomato seed oil from tomato processing waste.** *Journal of Food Science and Technology (India)* 36(3); 1999; 248-249

Tomato seeds were separated from tomato processing waste generated in a tomato paste

manufacturing unit. The oil expelled from these tomato seeds showed physical as well as chemical characteristics similar to any conventional oil. This oil can be successfully used in traditional breakfast item *Paratha* and also in cake. AA

Yams

1065

Okoh (RN). **Economic evaluation of losses in yams stored in traditional barns.** *Tropical Science* 38(3); 1998; 125-127

The stores of 30 farmers were studies for a yr., to identify the losses of yams due to rot, insects and rodents attacks and microorganisms. Early in the storage period, losses were low; they increased to a peak in April due to temp. fluctuations (25-39°C), and then declined as the tubers in store were depleted. On av., 0.85% of the yams in store were lost each month and 1.4% were partially damaged, 9.20% were not marketable but consumable. The total economic loss incurred was 10.7% of the expected gross revenue. SRA

FRUITS

1066

Bansal (RK). **Fruits and vegetable processing industry in India.** *Indian Food Packer* 52(5); 1998; 33-36

Production of fruits and vegetables from 1991 to 1995, processing of fruits and vegetables in the organised sector and outside the present Fruit Product Order (FPO) jurisdiction; and export of processed fruit and vegetable products from 1991 to 1998 are detailed. There are 4932 fruits and vegetable units licensed under FPO upto 1997 in 30 states of India. GS

Aonla

1067

Premi (BR), Sethi (V) and Maini (SB). **Effect of steeping preservation on the quality of aonla (*Emblica officinalis* Gaertn.) fruits during storage.** *Journal of Food Science and Technology (India)* 36(3); 1999; 244-247

The present study was undertaken to evaluate the efficacy of different chemical sol. to control the development of white specks (WS) is aonla fruits during a storage period of 90 days. A chemical sol. containing 10% salt and 0.04% KMS was found to be effective in controlling the development of WS during storage with max. retention of nutrients. The chemical sol. containing $CaCl_2$ irrespective of chemical preservative used, accelerated the development of WS and fruits stored in these chemical sol. were mushy in texture. Hence, the addition of lime or $CaCl_2$ may be avoided in case of steeping preservation of aonla fruit. AA

Apples

1068

Salvatori (D), Andres (A), Albors (A), Chiralt (A) and Fito (P). **Structural and compositional profiles in osmotically dehydrated apple.** *Journal of Food Science* 63(4); 1998; 606-610

Concn. profiles in apple tissue during osmotic dehydration were studied and compared with simultaneous structural changes. Experiments were conducted in apple slices (20 and 30 mm thick) at 20, 30, 40 and 50°C. After treatments, water and solutes were analyzed in serial slices 1.5 mm thick. The occurrence of an "Advancing Disturbance Front", (ADF) was proposed to describe the mass transfer. The ADF is located at a distance d_f to the interface, where the reduced driving force (Y) was 0.99. At distances $d > d_f$ (undisturbed zone) neither compositional nor structural changes were observed. Advancing constant rates for the ADF were determined, showing slight temp. dependence. A generalized equation $Y = f(d/d_f)$ described and fitted all the experimental data. AA

1069

Feng (H) and Tang (J). **Microwave finish drying of diced apples in a spouted bed.** *Journal of Food Science* 63(4); 1998; 679-683

Bananas

1070

Prabha (TN) and Bhagyalakshmi (N). **Carbohydrate metabolism in ripening banana fruit.** *Phytochemistry* 48(6); 1998; 915-919

A comprehensive picture of changes in carbohydrates, carbohydrate hydrolases, cell structure and texture in banana fruit during ripening is described. The insoluble carbohydrates were separated into seven fractions based on differential solubility. Their profiles and composition were followed as hydrolysis products. The starch and pectic fractions decreased considerably in ripe banana pulp. The significant decrease in glucose concn. in the hydrolysates of cold and hot water-soluble polysaccharides and that of xylose in the hydrolysates of hemicellulosic fractions (Hem A and B), indicated a pronounced glucan and xylan degradation during ripening. Some loss of mannose from the Hem "B" fraction at the ripe stage was also noticed. The various carbohydrate hydrolases, viz., polygalacturonase, pectin methyl esterase, xylanase, laminarinase, α- mannosidase, β-galactosidase, amylase, cellulase and hemicellulase registered a general increase in their activities. Low levels of endo-β-mannanase and galactanase activities could be detected only at the climacteric stage of ripening. More than 80% of the radio-activity of [^{14}C] starch was incorporated into soluble sugars, viz., glucose, fructose and sucrose, indicating active sugar interconversions. The total content of these soluble sugars increased from 1.8 to 19%, with a concomitant decrease in starch content during ripening. Microscopically, loss of cell wall integrity, cell wall thinning, increased intercellular spaces, loosening of cells and disappearance of starch granules were evident. In banana, it appears that pectinase may play a more dominant role in softening than cellulase. Amylase, xylanase and laminarinase may also contribute to loosening of cellular structures. AA

1071

Pathak (N) and Sanwal (GG). **Multiple forms of polygalacturonase from banana fruits.** *Phytochemistry* 48(2); 1998; 249-255

Three multiple forms of polygalacturonase (PG) in ripe and 2 in unripe banana (*Musa acuminata*) fruits were separated by DEAE-cellulose and further purified using Sephadex G-150 chromatography. The multiple forms can be differentiated from each other on the basis of their properties. PG1 and PG3 were identified as endo-PG and PG2 as exo-PG on the basis of decrease in viscosity, increase in reducing sugar and the reaction product. PG2 and PG3 increased with the ripening of fruits. PG1, PG2 and PG3 exhibited optimum activity at pH 3.3, 3.7 and 4.3 resp. Complete loss of PG2 and PG1 activities occurred at 60 and 70, but PG3 retained 60 and 50% activity resp. The 3 forms showed a different response towards divalent metal ions. Ca^{2+} activated PG1 activity only. Teepol 0.1%, inhibited PG1 activity by 25%, but PG2 and PG3 activities were completely inhibited. CTAB, 0.1%, had no effect on PG1 and PG2 activities, but inhibited PG3 activity by 40%. 2-ME stimulated PG2 and PG3 activities but had no effect on PG1 activity. Gel filtration through Sephacryl indicated M_r of 23,200, 58,000 and 130,000, resp., for PG1, PG2 and PG3. The substrate saturation curve for PG1 and PG2 were Michaelian, while PG3 showed biphasic curve. The Km values of PG1 and PG2 were 0.22% and 0.14%, resp. AA

Citrus fruits

Lemons

1072

Valero (D), Martinez-Romero (D), Serrano (M) and Riquelme (F). **Postharvest gibberellin and heat treatment effects on polyamines, abscisic acid and firmness in lemons.** *Journal of Food Science* 63(4); 1998; 611-615

Lemons at 2 ripening stages were vacuum-infiltrated with 100 ppm of gibberellin A_3 (GA_3) or heat-treated at 45°C, and then stored at 15°C for 3 wk. Both treatments increased fruit firmness either in stage 1 or in stage 2. Also, the levels of free putrescine and spermidine in the skin were higher in treated lemons than in controls but spermine concn. did not show significant differences, in fruits of either stage. GA_3 treatment was the most effective in retarding the colour change during storage, especially in stage 1 fruits, which was related to the lowest levels of abscisic acid found. AA

Kiwifruits

1073

Muntada (V), Gerschenson (LN), Alzamora (SM) and Castro (MA). **Solute infusion effects on texture of minimally processed kiwifruit.** *Journal of Food Science* 63(4); 1998; 616-620

Litchies

1074

Jiang (Y) and Fu (J). **Effect of postharvest treatment with N^6-benzyladenine on quality of litchi (*Litchi chinensis* Sonn.) fruit.** *Tropical Science* 38(3); 1998; 161-164

Postharvest treatment with N^6-benzyladenine (6-BA) was very effective in delaying browning and maintaining good quality of litchi fruit. The treatment reduced the physiological wt. loss, the titratable acidity and ascorbic acid, and the level of polyphenol oxidase and respiratory activity. This extended the storage life of the fruit. 6-BA residue was mainly restricted to the non-edible skin and was less than 0.05 µg/kg in the pulp after 6 days of storage. AA

Mandarin oranges

1075

Sonkar (RK) and Ladaniya (MS). **Effect of tray-over wrapping by heat shrinkable and stretchable films on Nagpur mandarin fruits.** *Indian Food Packer* 52(5); 1998; 22-26

Effect of heat-shrinkable (50µm thick LDPE) and stretch cling linear LDPE film (15um thick) for tray over-wrapping of Nagpur mandarin fruits were studied under low temp. storage (6-7°C; 90-95% RH) upto 60 days. Natural colour development was not affected in tray-wrapped fruit. Physiological loss in wt (PLW) was significantly reduced by heat-shrinkable and stretch cling PE films. Pre- (two sprays of carbendazim at the rate of 500 ppm at 15 days interval) and post-harvest (carbendazim at the rate of 2000 ppm) treatments almost completely checked microbiological spoilage. Carbon dioxide and ethylene levels increased inside the wrapped film, more so in heat-shrinkable PE and this adversely affected flavour and overall acceptability of fruit in that film. Fruits packed in stretch cling film had significantly higher flavour score %, better acceptability and freshness as compared with non-wrapped fruit after 60 days. Acidity and firmness of fruits decreased during storage with slight and inconsistent change in total soluble solids content. Film wrapping was efficient in containing water loss and retaining natural qualities during long term storage and post storage period at ambient condition for 2 days. AA

1076

Sonkar (RK) and Ladaniya (MS). **Individual film wrapping of Nagpur mandarin (*Citrus reticulata* Blanco) with heat-shrinkable and stretch-cling films for refrigerated storage.** *Journal of Food Science and Technology (India)* 36(3); 1999; 273-276

Heat-shrinkable (50 µm) LDPE and stretch-cling (15 µm) linear LLDPE films were evaluated for individual wrapping of Nagpur mandarin fruits to extend their shelf-life under refrigerated storage conditions (6-7°C; 90-95% RH) during Mrig crop season 1997. Wrapping of fruits reduced water loss drastically (1-2%) in both the films as compared with non-wrapped fruits (13.29%) at the end of refrigerated storage (60 days), followed by 2 days holding period at ambient condition. Two pre-harvest sprays with carbendazim (500 ppm) and post-harvest wash with chlorine (1000 ppm), followed by carbendazim (2000 ppm) treatment minimized decay (1-3%). Colour development was not adversely affected either by heat-shrinkable (LDPE) or stretch cling film (LLDPE). Respiration rate was low in film-wrapped fruits. Fruit firmness decreased except in non-wrapped fruits. Titratable acid content declined and change in total soluble was almost inconsistent. Flavour and overall acceptability scores were highest in stretch-cling film (LLDPE) wrapped fruits as compared with heat-shrinkable (LLDPE) and non-wrapped fruits at the end of storage. AA

Papayas

1077

Paul (PP), Majumder (K) and Mazumdar (BC). **Pectin content in peel and pulp of *Carica papaya* L. fruits.** *Science and Culture* 64(5-6); 1998; 127

Total pectin content of pulp and peel of papaya-Ranchi var. were studied in 5 stages of fruit development viz (I) wt. 640-650 g; stalk-sylar length 7.8-7.10 cm; (II) wt. 735-745 g, Int. 12.0-12.2 cm; (III) wt. 810-820 g, Int. 15.8-15.10 cm; (IV) wt. 1.220-1.230 kg, Int. 22.3-22.5 cm and (V) wt. 1.410-1.420 kg, Int. 26.8-27.0 cm (harvest maturity) in West Bengal, India. Polysaccharide had a steady increase both in the pulp and the peel upto stage (IV) of fruit development and thereafter declined. Peel had a higher amount of pectin than the pulp and content of pectin increased at a higher rate with fruit maturity upto stage (IV). GS

Peaches

1078

Brovelli (EA), Brecht (JK), Sherman (WB) and Sims (CA). **Quality of fresh-market melting- and nonmelting-flesh peach genotypes as affected by postharvest chilling.** *Journal of Food Science* 63(4); 1998; 730-733

After storage for 3 wk. at 4°C and ripening 3 days at 20°C, nonmelting-flesh peaches ('Oro A', FL 90-35C, FL 90-47C) did not develop visual symptoms of mealiness, while melting-flesh (MF) fruit (FL 90-20, FL 90-21, FL 91-16) did. Sensory evaluation showed that only MF fruit were more "mealy" and less "sweet" and "peachy" as a result of chilling. Volatile analysis revealed that chilling caused increases in (E)-2-hexenal and decreases in γ-and δ-decalactones in both MF and NMF types. However, the decline was considerably less in NMF than in MF fruit. Results indicate that chilling affects the quality of MF more than NMF genotypes. AA

Strawberries

1079

Haffner (K), Vestrheim (S), Jeksrud (WK) and Tengesdal (G). **L-ascorbic acid and other quality criteria in frozen and dehydrated strawberries *Fragariax ananassa* Duch.** *Die Nahrung* 42(1); 1998; 32-35 (De)

L-ascorbic acid contents and other quality criteria were measured in six cvs. of frozen and dehydrated strawberries. The drying method used was based on the energy saving principle of low-temp. dehydration in a closed cycle with a heat pump connected. The quality of the six cvs. varied, especially concerning L-ascorbic acid contents. On av. 69 mg L-ascorbic acid were found in 100 g frozen berries, with higher values for 'Zefyr' (94 mg) and 'Bounty' (89 mg). The loss of L-ascorbic acid after dehydration was on av. about 30%. AA

CONFECTIONERY, STARCH AND SUGAR

Chocolates

1080

Gojiya (NS) and Patel (SM). **Milk chocolate by panning methods.** *Indian Food Packer* 52(5); 1998; 5-10

Milk chocolate prepared by a simple panning method includes condensation of milk in a pan at atm. pressure and by adding cocoa powder, golden syrup, tripotassium orthophosphate, sugar, cocoa butter, glycerol monostearate and lecithin at proper stages. The milk chocolate contained, on an average, 8.58% moisture, 25.82% total fat, 10.16% total protein, 36.83% sucrose, 50.29% total sugar (as invert sugar), 3.11% total ash, 363mg/100g Ca, 377mg/100g P and 5523 cal energy. The milk chocolate thus prepared conforms to the compositional requirements of the Bureau of Indian Standards (IS1163:1992) and can be stored for 45 days of 27-30°C room temp. AA

Sugar

1081

Verma (PS), Saxena (MMS), Singh (BD) and Singh (GP). **CoS 92263- A mid late maturing variety for Uttar Pradesh.** *Indian Sugar* 48(7); 1998; 505-508

A new var. of sugarcane CoS 92263 was developed as the progeny of the cross Co 1158 x CoS 510 in 1987 in Comibatore, South India during 1990-91 and 1991-92 under 150kg N/ha and ratoon under 180 kg N/ha with normal irrigation and compared to Co 1148. It gave higher tonnage and yield. It was superior in commercial cane sugar due to higher yield and surcose % present in juice. CRG

1082

Rein (PN). **A view of cane diffusion in South African sugar mills.** *Indian Sugar* 48(7); 1998; 487-500

The review covers a brief history of the development of cane diffusion in South African sugar factories. Recent developments in cane diffusion process is cost-wise beneficial from return of clarifier muds directly to diffuser to increase application of diffusion. Low power requirement of the process is an added advantage relative to milling. Information on juice quality and the implication for sugar losses in the factory are considered. CRG

Sugars

1083

Chronakis (IS). **On the molecular characteristics, compositional properties, and structural-functional mechanisms of**

maltodextrins: A review. *CRC Critical Reviews in Food Science and Nutrition* 38(7); 1998; 599-637

Compositional, physicochemical and structural properties of maltodextrins and the most important advances that they have been made are critically reviewed. Description of maltodextrin system (production, compositional characteristics, dextrose equivalent detn.), properties (physicochemical characteristics, polymer water interaction of maltodextrin: hygroscopicity and storage, turbidity, precipitation, free and bound water), mechanism of network formation of maltodextrin gells, microstructure organisation of maltodextrin network, rheological properties (single system: low amplitude oscillatory studies, creep and stress relaxation measurements, large deformation properties; steric exclusion phenomena in mixed maltodextrin-biopolymers systems: blending laws, gelation and distribution of water in binary systems, large deformation properties of low fat spreads using maltodextrins), food applications and future directions are discussed. 136 references. SRA

BAKERY PRODUCTS

Bread

1084

Gobbetti (M). **The sourdough microflora: Interactions of lactic acid bacteria and yeasts.** *Trends in Food Science and Technology* 9(7); 1998; 267-274

Reviews trophic and non-trophic interactions between sourdough lactic acid bacteria (LAB) and yeasts based on the metabolism of carbohydrates and nitrogen compounds; the production of CO_2 and other volatile compounds and on the antimicrobial activity. The ratio of LAB to yeast cells in sourdoughs is generally 100:1, the major strains of LAB being *Lactobacillus sanfranciscensis*, *Lactobacillus plantarum* and *Lactobacillus brevis*. 69 references. GS

1085

Ravita and Chaudhary (K). **Use of *Saccharomyces cerevisiae* strains for breadmaking from different cereal flour blends.** *Journal of Food Science and Technology (India)* 36(3); 1999; 256-260

Studies were conducted, using 9 *S. cerevisiae* strains ('KAS', 'KOT', 'Hefe', 'Veeb', 'HAU-21', 'LBY', 'TBY', 'DBY' and 'a-Hap') for their maltase activities (MA), dough raising capacities (DRC) and breadmaking qualities, using wheat flour and different cereal flour blends. The results showed that both DRC and MA affected the baking quality of a yeast strain. Commercially used strain of *S. cerevisiae*, 'KOT' was found superior for breadmaking with wheat flour, the strains 'HAU-21', 'Hefe' and 'DBY' produced good quality breads, using a blend of 10% sorghum, triticale and soybean flour with wheat flour, resp. AA

Snacks

1086

Diaz (A), Lisse (I), Raoult-Wack (AL) and Bricas (N). **Consumption trends of plantain chips and consumer appreciation of their quality in Cali (Colombia).** *Tropical Science* 38(3); 1998; 171-178

1087

Suknark (K), McWatters (KH) and Phillips (RD). **Acceptance by American and Asian consumers of extruded fish and peanut snack products.** *Journal of Food Science* 63(4); 1998; 721-725

Fish snack half-products were produced using extrusion temp. and screw speeds of 97°C and 285 rpm, 95°C and 350 rpm, and 95°C and 220 rpm. Peanut snack half-products were produced at 100°C and 250 rpm, 95°C and 325 rpm, and 95°C and 250 rpm. The half-products were fried at 200°C for 1.5 min and evaluated for acceptability using a 9-point hedonic scale. Temp. and screw speed influenced consumer acceptance. Aroma, flavour, and overall acceptance of fish snack products were rated significantly higher by Asian consumers (n = 30) than by American consumers (n = 30). There was no significant difference in ratings for all sensory attributes and overall acceptance of peanut snack products by Asian or American consumers. AA

MILK AND DAIRY PRODUCTS

1088

Nayak (SK), Pattnaik (P) and Mohapatra (DP). **N-nitrosamines: As contaminants in dairy products.** *Indian Food Industry* 17(3); 1998; 168-173

N-nitrosamines are secondary metabolites of amines and nitrites having exceptionally high carcinogenic activity. The presence of N-nitrosamines in dairy products, its toxicity, mechanism of carcinogenesis, mechanism of nitrosatable reaction, factors affecting N-nitrosamines formation, detn. of N-nitrosamines, inhibition and decontamination of N-nitrosamines are the various aspects covered. CSA

1089

Lee (H-Y) and Dungan (SR). **Selective solubilization of α-lactalbumin and β-lactoglobulin into reversed micelles from their mixtures.** *Journal of Food Science* 63(4); 1998; 601-605

Phase transfer experiments were performed, involving contact between an aqueous 1:1 sol. of α-lactalbumin and β-lactoglobulin and an AOT-in-isooctane reversed micellar phase. The resulting extraction and separation of the 2 proteins were analyzed as functions of pH, ionic strength and total protein concn. using SDS-PAGE, and compared with extractions from pure sol. At low protein concn., the extent of reversed micellar solubilization of the 2 pure proteins predicted well the extraction from mixtures. However, at higher protein concn. β-lactoglobulin appeared to be excluded from the micellar droplets. Because of the significantly different partitioning behaviour of the 2 proteins, reversed micellar extraction from an initially equal wt. mixture led to an effective separation of the proteins. AA

Milk

1090

Sharma (V) and Raj (D). **Storage changes in lactose and protein of lactoperoxidase - H_2O_2 system treated milk preserved with formalin.** *Journal of Food Science and Technology (India)* 36(3); 1999; 239-240

Effect of formalin as sample preservative was studied on lactoperoxidase - H_2O_2 system activated milk. Lactoperoxidase system (LP 25:15 and LP 70:30) was activated by adding 25 ppm and 70 ppm thiocyanate and 15 ppm and 30 ppm H_2O_2 in 2 different experiments. These samples were analyzed for lactose and protein. The lactose values were found to be 5.01 plus or minus 0.02% and 5.02 plus or minus 0.02% in LP 25:15 and LP 70:30 these samples were 3.70 plus or minus 0.01% and 3.79 plus or minus 0.03%. After addition of 0.4% formalin and storage upto 6 months, no significant change ($P < 0.01$) was observed in lactose and protein values. Even after the storage of 2, 4 and 6 months, these values remained unchanged. AA

1091

Jung (MY), Lee (KH) and Kim (SY). **Retinyl palmitate isomers in skim milk during light storage as affected by ascorbic acid.** *Journal of Food Science* 63(4); 1998; 597-600

Effects of ascorbic acid (AA) addition on the contents of retinyl palmitate isomers in skim milk treated with or without 3 mg/mL added riboflavin were studied during storage for 30 h under fluorescent light. Light illumination induced the reduction of all-*trans*-retinyl palmitate and 13-*cis* isomer, but promoted the production of 9-*cis* isomer in the skim milk. Riboflavin increased the reduction of all-*trans*-retinyl palmitate, but decreased the formation of 9-*cis* isomer in light-stored skim milk. The addition of AA greatly inhibited the light-induced reduction of all-*trans*-retinyl palmitate and 13-*cis* isomer in skim milks. AA also greatly increased the formation of 9-*cis*-retinyl palmitate in skim milks during light storage. AA

1092

Lucey (JA), Munro (PA) and Singh (H). **Rheological properties and microstructure of acid milk gels as affected by fat content and heat treatment.** *Journal of Food Science* 63(4); 1998; 660-664

Gels were made from recombined milks containing 0, 1.5 or 3.5% fat that were heated at 75, 80 or 90°C for 30 min, followed by acidification with glucono-δ-lactone at 30°C. The rheological and microstructural properties of acid gels were investigated using dynamic low-amplitude oscillatory rheology and confocal scanning laser microscopy (CSLM). Heating milks, at temp. greater than or equal to 80°C, increased the storage moduli (G') and decreased the gelation time. Recombined milks containing high fat (3.5%) had higher G' than gels made from low-fat or skim milk. Milk heat treatment resulted in gels with a cross-linked microstructure. Recombined fat globules appeared to be embedded in the protein matrix. AA

1093

Fuente (MADL). **Changes in the mineral balance of milk submitted to technological treatments.** *Trends in Food Science and Technology* 9(7); 1998; 281-288

Reviews the effect of a var. of process, such as changing pH, refrigeration, freezing, heat treatments, CO_2 addition, high pressure treatment and ultra filtration, on the mineral balance of milk. The effects of changes in mineral balance on rennet coagulation during cheesemaking, is emphasized. 34 references. GS

Milk products

1094

Goak (M) and Wolkerstorfer (W). **Product specific microorganisms in fermented dairy products.** *Deutsche Lebensmittel-Rundschau* 94(6); 1998; 179-181 (De)

The following article compares 4 different microbiological media relating to their usefullness in isolation and enumeration of yoghurt culture genera in fermented dairy products. The main problem, namely to check up the number of living microorganisms in fermented dairy products, which is laid down in the Codex Allimentarius Austriacus is solved by using the modified Elliker Agar and the acidified MRS-Agar. AA

Cheese

1095

Rodriguez (J), Requena (T) and Juarez (M). **Process for low-fat cheese from ultrafiltered milk.** *Journal of Food Science* 63(4); 1998; 665-667

1096

El-Sayed (MM), Hamid (FFA), Ahmed (YM), Ali (SH), Mansour (OY), Abdallah (NM). **Biochemical studies on proteins from cheese whey and blood plasma by-products.** *Die Nahrung* 42(1); 1998; 12-15

Efforts have been done to recover proteins from waste liquors rich in protein in a soluble form. Cheese whey and animal bloods are byproducts from the manufacture of cheese and meat. It contains a var. of proteins which can be reclaimed. The efficiency of protein precipitation from the sweet-cheese whey by the use of CMC. Both are greater than that precipitated by trichloro acetic acid. The same results of the efficiency of precipitation were attained when the plasma protein was precipitated. It was found that cheese-whey protein-HEC-complex contain a large amount of essential amino acids. Electrophoretic separation of whey protein complex showed that β-lactoglobulin forms the major fraction while in case of plasma protein complex albumin forms the major fraction. The fractionation patterns of different complexes with HEC, CMC or TCA gave the same components and about the same ratio. It appears from these results that HEC-protein complexes are preferable than CMC-protein complexes or proteins precipitated by TCA. Chemical analysis of whey protein complexes revealed that lactose content of whey protein-HEC-complex was higher than that of CMC-complex or protein precipitated by TCA. Elemental analysis of protein complexes showed that the level of Na, P and K was increased while that of Cu or Zn decreased. Cellulose derivative protein complexes showed no significant effects on the liver or kidney function of albino rat and these results indicated that no toxic effect was observed from the uses of these protein complexes in feeding. AA

1097

Patel (HG) and Upadhyay (KG). **An alternate technology for manufacture of buffalo milk pizza cheese.** *Journal of Food Science and Technology (India)* 36(3); 1999; 235-238

An alternate technology for plasticising the curd in dry condition with emulsifying salts was developed and compared with traditional technology with respect to its impact on functional characteristics and composition of resultant cheese. The results revealed that alternate method of plasticising the curd could be put in practice successfully for the manufacture of buffalo milk Mozzarella cheese with different functional properties as well as improved yield. Addition of 1.0-1.5% mixture of trisodium citrate and disodium phosphate in 1:1 or 2:1 proportion, heating at 65-70°C for 10-15 min and then moulding is recommended for commercial exploitation. AA

1098

Rodriguez (J). **Recent advances in the development of low-fat cheeses.** *Trends in Food Science and Technology* 9(6); 1998; 249-254

Reviews the state-of-the-art in the production of low-fat cheeses; sensory limitations in low-fat cheeses like poor aroma and flavour, rubbery or dry/grainy texture, excessive hardness and bitterness; and technological modifications in cheesemaking like addition of ultrafiltered (UF) milk, addition of fat replacers (like Simplesse, Dainglo, Stelar or Novagel) and condensed milk, in order to improve low-fat cheese. 50 references. GS

Churpi

1099

Pal (PK), Hossain (SA) and Sarkar (PK). **Instron texture profile of *Churpi* as influenced by proximate composition.** *Journal of Food Science and Technology (India)* 36(3); 1999; 222-225

Churpi, a traditional milk product, prepared in Bhutan had very low moisture, fat, water-dispersible protein, titratable acidity and energy value than that prepared in Sikkim and Darjeeling. Total solids of *Churpi* had a positive correlation with Instron hardness, cohesiveness, gumminess and chewiness. On the other hand, water-dispersible protein had the opposite effect with all the Instron parameters. Total fat, free fat and titratable acidity were negatively correlated with the Instron parameters. Total solids, titratable acidity, free fat and water-dispersible protein predicted 55% variation in hardness, 79% in cohesiveness, 81% in gumminess and 75% in chewiness ($P < 0.001$), which are considered substantial in view of the complexity of the product's texture. AA

Ice cream

1100

Groschner (P). **Production of ice cream by using honey instead of sugar.** *Deutsche Lebensmittel-Rundschau* 94(7); 1998; 214-217 (De)

Wheys

1101

Chakraborty (P) and Dutta (SK). **Kinetics of lactic acid production by *Lactobacillus delbrueckii* and *L. bulgaricus* in glucose and whey media.** *Journal of Food Science and Technology (India)* 36(3); 1999; 210-216

The kinetics of lactic acid production from glucose and whey at a given substrate concn. level was studied, using *Lactobacillus delbrueckii* and *Lactobacillus bulgaricus*, separately. The max. lactic acid production from glucose was 46 g/l and carbon conversion was around 35% after 40 h at optimum pH 5.30 with *L. delbrueckii*. The max. production rate was attained after 36 h of fermentation, which remained constant till 42 h. The same culture in whey medium produced max. lactic acid of 30 g/l after 60 h of fermentation at pH 5.30. The acid production values per unit cell in glucose and whey media were 4.66 g/UOD/ml and 0.818 g/UOD/ml, resp., at pH 5.30 after 72 h of fermentation. Lactic acid production from whey medium using *L. bulgaricus* was 55 attained after 12 h of fermentation which remained constant upto 18 h of fermentation. Thereafter, productivity fell sharply, although acid production continued upto 72 h. The lower saturation constant value of *L. delbrueckii* in whey medium compared to glucose medium at pH 5.30 supported its better growth in the former medium. The max. yield of lactic acid in glucose medium was 35% higher than that of whey at pH 5.30, when fermented with *L. delbrueckii*. Fermentation of whey medium with *L. bulgaricus* and *L. delbrueckii* gave a max. yield of lactic acid (YP) 0.94 and (YP) 0.71 on the basis of initial lactose consumption and the former was very close to the theoretical value (1.05). Lactic acid was separated in down stream processing by electrodialysis method. The optimum production of lactic acid was obtained, when calcium lactate concn. and flow of current were maintained at 5% and 0.3 amp, resp. AA

1102

Zorba (O), Ozdemir (S) and Gokalp (HY). **Stability of model emulsions prepared using whey and muscle proteins.** *Die Nahrung* 42(1); 1998; 16-18

The amount of water (SW) and oil (SO) separated from model emulsions and emulsion stability (ES) of these emulsions prepared from corn oil and of fluid whey, total muscle protein (TMP), whey + TMP and sarcoplasmic protein (SP) were examined. The SW value of whey + TMP emulsions was lower (26.33%) than that of TMP (31.33%), SP (39.0%) practically the same as that of whey only. However, the SO value of whey emulsions was higher (9.40%) than that of muscle protein emulsions (0.0%). It was found that there was no oil separation in whey + TMP emulsion. Whey proteins had the lowest ES (64.6 plus or minus 0.96) among the proteins studied.

Nevertheless, whey + TMP emulsions had the highest ES (73.67 plus or minus 0.58). AA

Whey proteins

1103

Jayaprakasha (HM) and Brueckner (H). **Whey protein concentrate: A potential functional ingredient for food industry.** *Journal of Food Science and Technology (India)* 36(3); 1999; 189-204

Whey was all along been considered as a waste product and looked upon seriously by the environmentalists and technologists due to its potent polluting strength. Now-a-days, however, it is no longer considered a waste product but a treasure chest of nutritionally rich whey protein, which has been unlocked by the modern processing technology, enabling them to recover economically in their native form. The advent of this technology has been a great boon to recover these precious solids in the form of whey protein conc. (WPC). The whey proteins are potentially nutritional and functional food ingredients for use in a wide range of food types and can replace expensive ingredients such as egg white and milk proteins. It also contributes to the development of new food products. WPC are generally recognized as safe for food product application and not specifically restricted by standards of identity. This review focusses on functional aspects of WPC in relation to their application in food products formulation. AA

Yoghurts

1104

Lopez (MC), Medina (LM) and Jordano (R). **Survival of lactic acid bacteria in commercial frozen yoghurt.** *Journal of Food Science* 63(4); 1998; 706-708

Survival of constitutive lactic acid bacteria (LAB) was studied in 265 samples from 3 batches of commercial frozen yoghurt stored at -23°C for one yr. The total LAB in the 3 batches was > 10^7 CFU/g, and batch C was comprised exclusively of streptococci. Decreasing LAB counts in batches A and B were very slight. Experimental storage conditions resulted in the survival of LAB even after the 60 to 67 wk. period. AA

1105

Vijaya Rao (D). **HACCP concepts in relation to animal food industry.** *Indian Food Industry* 17(3); 1998; 158-161

Meat foods and industry, meat borne disease and role of microorganisms, safety and quality in food production, risk assessment by identification of hazard, critical control points, team approach, hazard analysis and operatability studies, specific pathogen free herds concept and nurmi concept are the aspects discussed. CSA

Meat

1106

Cook (CJ), Scott (SM) and Divine (CE). **Measurement of nitric oxide and the effect of enhancing or inhibiting it on tenderness changes of meat.** *Meat Science* 48(1/2); 1998; 85-89

1107

Koh (MC), Lim (CH), Chua (SB), Chew (ST) and Phang (TW). **Random amplified polymorphic DNA (RAPD) fingerprints for identification of red meat animal species.** *Meat Science* 48(3/4); 1998; 275-285

1108

Langourieux (S) and Escher (FE). **Sulfurous off-flavour formation and lipid oxidation in heat-sterilized meat in trays.** *Journal of Food Science* 63(4); 1998; 716-720

The development of a strong sulphurous off-flavour as compared to lipid oxidation in heat-sterilized meat in trays was investigated. H_2S and ethane were used as indicators for sulphurous off-flavour and lipid oxidation, resp. Nitrogen flushing suppressed oxidation but greatly enhanced formation of H_2S. Concn. of H_2S were lower in HTST-processed meat and also decreased during storage of both nonflushed and nitrogen-flushed samples. The addition of rosemary extract as primary antioxidant lessened both H_2S and ethane formation for a limited storage period. Citric acid as the secondary antioxidant had little effect. Use of a primary antioxidant and application of HTST process

conditions seemed to balance H_2S and ethane formation. AA

1109

McCord (A), Smyth (AB) and O'Neill (EE). **Heat-induced gelation properties of salt-soluble muscle proteins as affected by non-meat proteins.** *Journal of Food Science* 63(4); 1998; 580-583

1110

Sofos (JN) and Smith (GC). **Nonacid meat decontamination technologies: Model studies and commercial applications.** *International Journal of Food Microbiology* 44(3); 1998; 171-188

This paper presents an overview of freshmeat and poultry decontamination with technologies, other than organic aids and with emphasis placed on recent advances and on application in commercial operations of procedures to reduce contamination of carcasses. Animal washing and chemical dehairing, spot-cleaning/decontamination of carcasses by knife-trimming or steam/hot water-vacuuming, decontamination of carcasses by washing/spraying/rinsing (by nonacid chemicals, hot water), decontamination of carcasses with pressurized steam, multiple Hurdle decontamination approach and effect of decontamination on meat quality, shelf-life and safety. 93 references. BV

1111

Smulders (FJM) and Greer (GG). **Integrating microbial decontamination with organic acids in HACCP programmes for muscle foods: Prospects and controversies.** *International Journal of Food Microbiology* 44(3); 1998; 149-169

Aspects covered in this review are: meat model systems (carcasses, meat cuts, meat tissue models, organoleptic/physical implications, salts of organic acids and other derivatives, and role of organic acids in a HACCP-based system). Many references. BV

1112

Perez (ML), Escalona (H) and Guerrero (I). **Effect of calcium chloride marination on calpain and quality characteristics of meat from chicken, horse, cattle and rabbit.** *Meat Science* 48(1/2); 1998; 125-134

1113

Saba (A) and Natale (RD). **A study on the mediating role of intention in the impact of habit and attitude on meat consumption.** *Food Quality and Preference* 10(1); 1999; 69-77

1114

Paleari (MA), Camisasca (S), Beretta (G), Renon (P), Corsico (P), Bertolo (G), Crivelli (G). **Ostrich meat: Physico-chemical characteristics and comparison with turkey and bovine meat.** *Meat Science* 48(3/4); 1998; 205-210

Beef

1115

Sekikawa (M), Seno (K) and Mikami (M). **Degradation of ubiquitin in beef during storage.** *Meat Science* 48(3/4); 1998; 201-204

1116

Geileskey (A), King (RD), Corte (D), Pinto (P) and Ledward (DA). **The kinetics of cooked meat haemoprotein formation in meat and model system.** *Meat Science* 48(3/4); 1998; 189-199

1117

Dikeman (ME), Cundiff (LV), Gregory (KE), Kemp (KE) and Koch (RM). **Relative contributions of subcutaneous and intermuscular fat to yields and predictability of retail product, fat trim, and bone in beef carcasses.** *Journal of Animal Science* 76(6); 1998; 1604-1612

1118

Thyholt (K), Enersen (G) and Isaksson (T). **Determination of endpoint temperatures in previously heat treated beef using reflectance spectroscopy.** *Meat Science* 48(1/2); 1998; 49-63

1119

Lin (K-W) and Keeton (JT). **Textural and physicochemical properties of low-fat, precooked ground beef patties containing carrageenan and sodium alginate.** *Journal of Food Science* 63(4); 1998; 571-574

1120

Oka (A), Maruo (Y), Miki (T), Yamasaki (T) and Saito (T). **Influence of vitamin A on the quality of beef**

from the tajima strain of Japanese black cattle. *Meat Science* 48(1/2); 1998; 159-167

1121

Sachindra (NM), Sakhare (PZ) and Rao (DN). **Reduction in microbial load on buffalo meat by hot water dip treatment.** *Meat Science* 48(1/2); 1998; 149-157

1122

O'Mara (FM), Williams (SE), Tatum (JD), Hilton (GG), Pringle (TD), Wise (JW), Williams (FL). **Prediction of slaughter cow composition using live animal and carcass traits.** *Journal of Animal Science* 76(6); 1998; 1594-1603

1123

Luno (M), Beltran (JA) and Roncales (P). **Shelf-life extension and colour stabilisation of beef packaged in a low O_2 atmosphere containing CO: Loin steaks and ground meat.** *Meat Science* 48(1/2); 1998; 75-84

1124

King (VAE) and Chen (J-F). **Oxidation of controlled low-temperature vacuum dehydrated and freeze-dried beef and pork.** *Meat Science* 48(1/2); 1998; 11-19

Steer

1125

Allingham (PG), Harper (GS) and Hunter (RA). **Effect of growth path on the tenderness of the *Semitendinosus* muscle of Brahman-cross steers.** *Meat Science* 48(1/2); 1998; 65-73

Mutton

Sheep

1126

Mahgoub (O). **Ultrasonic scanning measurements of the *Longissimus thoracis et lumborum* muscle to predict carcass muscle content in sheep.** *Meat Science* 48(1/2); 1998; 41-48

This study showed significant relationships between longissimus muscle max. depth and area measurements obtained from ultrasound scanning with corresponding carcass measurements. Two other scanning measurements circumference and vol., also had significant relationships with corresponding measurements. All these significant relationships indicate that they may be used for prediction of carcass muscle content in live sheep. SRA

Lamb

1127

Jeremiah (LE). **Development of a quality classification system for lamb carcasses.** *Meat Science* 48(3/4); 1998; 211-223

In this study, a total of 39 carcass parameters were regressed on consumer ratings of the acceptability of overall palatability of shank and but leg roasts using regression analysis to examine potential relationships. Based on these parameters the lamb carcasses were segregated into 3 quality groups. Group 1 possessing very red and moist breakjoints and round, red ribs, group 2 possessing slightly red to red breakjoints and oval shaped ribs, and group 3 possessing white, dry breakjoints and flat, white ribs. SRA

1128

Sanudo (C), Nute (GR), Campo (MM), Maria (G), Baker (A), Sierra (I), Enser (ME), Wood (JD). **Assessment of commercial lamb meat quality by British and Spanish taste panels.** *Meat Science* 48(1/2); 1998; 91-100

Pork

1129

Berends (BR), Knapen (FV), Mossel (DAA), Burt (SA) and Snijders (JMA). ***Salmonella* spp. on pork at cutting plants and at the retail level and the influence of particular risk factors.** *International Journal of Food Microbiology* 44(3); 1998; 207-217

1130

Lundstrom (K), Enfalt (A-C), Tornberg (E) and Agerhem (H). **Sensory and technological meat quality in carriers and non-carriers of the RN$^-$ allele in Hampshire crosses and in purebred Yorkshire pigs.** *Meat Science* 48(1/2); 1998; 115-124

1131
Cheah (KS), Cheah (AM) and Just (A). **Identification and characterization of pigs prone to producing 'RSE' (reddish-pink, soft and exudative) meat in normal pigs.** *Meat Science* 48(3/4); 1998; 249-255

1132
Gade (PB) and Christensen (L). **Effect of different stocking densities during transport on welfare and meat quality in Danish slaughter pigs.** *Meat Science* 48(3/4); 1998; 237-27

1133
Lefaucheur (L), Hoffman (RK), Gerrard (DE), Okamura (CS), Rubinstein (N), Kelly (A). **Evidence for three adult fast myosin heavy chain isoforms in type II skeletal muscle fibers in pigs.** *Journal of Animal Science* 76(6); 1998; 1584-1593

1134
Jimenez-Colmenero (F), Fernandez (P), Carballo (J) and Fernandez-Martin (F). **High-pressure-cooked low-fat pork and chicken batters as affected by salt levels and cooking temperature.** *Journal of Food Science* 63(4); 1998; 656-659

1135
Houben (JH), Eikelenboom (G) and Hoving-Bolink (AH). **Effect of the dietary supplementation with vitamin E on colour stability and lipid oxidation in packaged, minced pork.** *Meat Science* 48(3/4); 1998; 265-273

1136
Funami (T), Yotsuzuka (F), Yada (H) and Nakao (Y). **Thermoirreversible characteristics of curdlan gels in a model reduced fat pork sausage.** *Journal of Food Science* 63(4); 1998; 575-579

1137
Candek-Potokar (M), Zlender (B), Lefaucheur (L) and Bonneau (M). **Effects of age and/or weight at slaughter on *longissimus dorsi* muscle: Biochemical traits and sensory quality in pigs.** *Meat Science* 48(3/4); 1998; 287-300

1138
Novelli (E), Zanardi (E), Ghiretti (GP), Campanini (G), Dazzi (G), Madarena (G), Chizzolini (R). **Lipid and cholesterol oxidation in frozen stored pork, salame milano and mortadella.** *Meat Science* 48(1/2); 1998; 29-40

Rabbits

1139
Anil (MH), Raj (ABM) and McKinstry (KL). **Electrical stunning in commercial rabbits: Effective currents spontaneous physical activity and reflex behaviour.** *Meat Science* 48(1/2); 1998; 21-28

Electrical stunning was evaluated in commercial slaughter rabbits. Different voltage applications with varying current duration were tested in recovery experiments in 71 animals. Stunning parameters and duration of insensibility were measured and analysed for assessing stunning effectiveness. A min. stunning current of 140 mA which can be achieved with application of 100 V was recommended. AA

1140
Gondret (F), Juin (H), Mourot (J) and Bonneau (M). **Effect of age at slaughter on chemical traits and sensory quality of *longissimus lumborum* muscle in the rabbit.** *Meat Science* 48(1/2); 1998; 181-187

The effect of age on chemical composition and sensory quality of *longissimus lumborum* muscle was investigated in rabbits slaughtered at 11 wks. or 18 wks. of age. Intramuscular fat (IMF) content increased from 1.3 to 2.2%, crude protein content ranged from 23.4-26.9%, whereas water content declined from 74.0 to 69.3%, as the age increased. The sensory quality was assessed by a 10-member experienced sensory panel. The age was found to affect meat tenderness, whereas juiciness and flavour did not differ significantly between ages. A positive trend was observed between tenderness and IMF content, both within age and between ages. Therefore, differences in sensory quality of rabbit meat were at least partly related to IMF content. AA

Products

1141
Pena (MP), Cid (MC) and Bello (J). **A method for identification of frozen meat used for production of cooked ham.** *Meat Science* 48(3/4); 1998; 257-264

Frankfurters

1142

Hughes (E), Mullen (AM) and Troy (DJ). **Effects of fat level, tapioca starch, and whey protein on frankfurters formulated with 5% and 12% fat.** *Meat Science* 48(1/2); 1998; 169-180

Ham

1143

Piette (J-PG), Ligneau (L), Leblanc (C), Marcotte (M) and Deschenes (L). **Influence of processing on adherence of a highly extended ham to its cooking bag.** *Meat Science* 48(1/2); 1998; 101-113

Poultry

Chickens

1144

Galvin (K), Morrissey (PA) and Buckley (DJ). **Cholesterol oxides in processed chicken muscle as influenced by dietary α-tocopherol supplementation.** *Meat Science* 48(1/2); 1998; 1-9

Broiler chicks (cobb 500 strain) were fed diets supplemented with 20, 200 or 800 mg α-tocopheryl acetate kg^{-1} feed. Cooked breast and thigh muscle patties were prepared and stored at 4°C for up to 12 days. Dietary supplementation significantly ($P < 0.05$) increased α-tocopherol concn. in cooked muscle and decreased thiobarbituric acid-reacting substances (TBARS) during storage. Cholesterol oxidation products (COPs) increased during storage. Total COPs ranged from 0.17-3.48 and 2.49-5.79 μg g^{-1} in breast and thigh meat, resp. TBARS and total COPs were linearly correlated in breast ($r = 0.68$, $P < 0.001$), and thigh patties ($r = 0.75$, $P < 0.05$). Dietary α-tocopheryl acetate supplementation significantly ($P < 0.05$) reduced the formation of COPs during storage. Total COPs formed after 12 days were reduced by 42 and 75% in breast, and 50 and 72% in thigh, at supplementation levels of 200 and 800 mg kg^{-1} feed resp. Results suggest that dietary α-tocopherol supplementation may play a valuable role in improving the stability of cholesterol and safety of muscle foods. SRA

1145

Xiong (H), Li (Y), Slavik (M) and Walker (J). **Chemical spray conditions for reducing bacteria on chicken skins.** *Journal of Food Science* 63(4); 1998; 699-701

1146

King (YT) and Chen (TC). **Chemical and physical characteristics of chicken livers following adrenocorticotropic hormone-induced stress.** *Journal of Food Science* 63(4); 1998; 580-591

1147

Smyth (AB), Smith (DM) and O'Neill (E). **Disulphide bonds influence the heat-induced gel properties of chicken breast muscle myosin.** *Journal of Food Science* 63(4); 1998; 584-588

1148

Smyth (AB), McCord (A) and O'Neill (E). **Heat-induced gelation properties of chicken breast muscle salt soluble proteins when mixed with β-lactoglobulin or an α-lactalbumin enriched protein fraction.** *Meat Science* 48(1/2); 1998; 135-147

The heat-induced gelation properties of mixed protein systems containing chicken breast muscle salt-soluble proteins (SSP) and β-lactoglobulin (β-lg) or SSP and an α-lactalbumin-enriched fraction (α-la) in 0.6 M NaCl, pH 6.5, were investigated using dynamic rheology. At 70°C, SSP had greater storage modulus (G') values than mixtures containing SSP/α-lg. However, at 90°C, mixtures containing 80:20 and 60:40 SSP: β-lg had higher G' values than SSP alone, indicating that denaturation of β-lg directly or indirectly facilitates the formation of a more rigid gel structure. On subsequent cooling to 20°C, the extent of structure formation, as reflected by G' values, was greater for SSP than for mixtures containing SSP/β-lg, which suggests that the denatured β-lg is unable to interact with the SSP during cooling. Mixtures containing SSP and an α-la-enriched fraction had lower G' values than SSP at 90°C and on subsequent cooling to 20°C, which reflects the poor gelling properties of α-la. A fibrous network was observed when the microstructure of the SSP and 40:60 SSP: α-la gels were examined using scanning electron microscopy, while aggregated networks were seen in the β-lg and 40:60 SSP: β-lg gels. No significant differences ($P > 0.05$) were observed between the water holding capacity (WHC) of SSP and SSP/β-lg gels. Gels

formed from a mixture of SSP and the α-la-enriched fraction had lower WHC than the SSP gels. The myosin heavy chain was a major contributor to gel structure formation in all mixed gel systems. AA

Turkeys

1149
Mercier (Y), Gatellier (p), Viau (M), Remignon (H) and Renerre (M). **Effect of dietary fat and vitamin E on colour stability and on lipid and protein oxidation in turkey meat during storage.** *Meat Science* 48(3/4); 1998; 301-318

The effects of dietary fat (DF) having 6% soy oil (SO) or rapeseed oil (RSO) or tallow, together with tocopheryl acetate at 30 ppm based or supplemented 400 ppm level for 16 wk. on lipid and protein oxidation, including myoglobin, during refrigerated storage (RS) of turkey muscles was studied. When turkey were fed tallow, vitamin E supplementation improved the vitamin E status of the muscles. VES significantly delayed lipid oxidation measured by TBARS, whatever the DF. TBARS were highest in meat from animals fed SO. VES had no positive effect on colour stability of meat during RS. Feeding SO induced significantly higher oxidation of proteins (carbonyl content) than RSO or tallow and VES induced a slight decrease in carbonyl content at day 9 of storage for *M. sartorius*. SRA

Products

Eggs

1150
Kang (KR), Geetha Cherian and Sim (JS). **Tocopherols, retinol and carotenes in chicken egg and tissues as influenced by dietary palm oil.** *Journal of Food Science* 63(4); 1998; 592-596

SEAFOODS

1151
Dines (DS). **Escherichia coli indicator of seafood quality and public health.** *Seafood Export Journal* 30(1); 1999; 15-17

The microbial quality of the seafood is assessed considering the health of the consumers. An estimation of the *Escherichia coli* gives the status of the sanitary hygenic conditions in the processing seafood plants and indicates the occurrence of other pathogenic bacteria. The biochemical characterisation technique, specific to the strains of *E. coli* 0157:H7, is affordable for commercial purposes. GS

Cuttlefish

1152
Ramachandran (A). **Time study for the commercial production of block frozen whole squid/cuttlefish in 2 Kg pack.** *Fishery Technology* 35(2); 1998; 73-79

A time study was conducted to work out the normal time (NT) and standard time (ST) required for each element or activity in the commercial production viz. a batch of 220 slabs of 2 kg each of block frozen whole squid (*Loligo duvauceli*) and cuttlefish (*Sepia pharaonis*). A standard flow chart was deveolped to minimise the handling and processing time, and also to mininise the exposure of the raw material to higher temp. The important allowances to be considered in calculating the ST were identified as personnel, standing and fatigue and process allowances. Filling, setting in trays, glazing and loading in trolleys were considered as an integrated activity and found to consume 112.0 min as NT and 128.47 min as ST for producing one batch 220 slab of 2 kg each. Process cycle time (PCT) was estimated to be 305 min for the production and storage of 220 frozen blocks of whole squid/cuttlefish. PCT could be further reduced by introducing modern freezers with shorter freezing time and automated master carton sealing system. SRA

Shrimps

1153
Zheng (M), Huang (YW), Nelson (SO), Bartley (PG) and Gates (KW). **Dielectric properties and thermal conductivity of marinated shrimp and channel catfish.** *Journal of Food Science* 63(4); 1998; 668-672

Peeled shrimp (*Peneaus* spp.) and channel catfish (*Ictalutus punctatus*) fillets were either mixed with commercial lemon pepper marinade and vacuum tumbled at 4°C for 30 min or soaked in 2% tripolyphosphate sol. overnight. Dielectric constant and loss factor of marinated seafood and the

penetration depth of microwaves were functions of temp. When cooking temp. incrased, the dielectric constant increased, while the loss factor and depth of penetration decreased. Because of the large variation in thermal conductivity measured for individual shrimp, no correlation between thermal conductivity and temp. was found. At constant temp., thermal conductivity of 2% sodium tripolyphosphate-treated shrimp was higher than that of both marinated and nonmarinated shrimp as a result of higher moisture content. However, no difference in thermal conductivity was found between marinated and nonmarinated shrimp or catfish. AA

Fish

1154

Rajeswari (T) and Hammeed (MS). **Frozen storage characteristics of *Oratosquilla nepa*.** *Fishery Technology* 35(2); 1998; 95-98

Squilla (*Oratosquilla nepa*) was quick frozen at 40°C as whole and as meat and stored at -18°C upto 10 months. The shelf life was evaluated by following biochemical, physical and sensory quality changes that occurred during storage. There was a progressive fall in the bacterial count (200 x 1000 cfu) during the first 3 months of storage. After 4 months it increased slowly to reach 700 x 1000 cfu and till the end of 7 months period. Trimethyl amine values were found to decrease from 15 to 5 mg/100g and volatile N_2 from 20 to 15mg/100g after 6 months of storage. Sensory quality of squilla was acceptable upto 5 months and could be used for further processing into value added products. SRA

1155

Tewfik (IH), Ismail (HM) and Sumar (S). **A rapid supercritical fluid extraction method for the qualitative detection of 2-alkylcyclobutanones in** γ-irradiated fresh and sea water fish. *International Journal of Food Sciences and Nutrition* 50(1); 1999; 51-56

A simple and rapid method for the isolation of markers (2-alkylcyclobutanones (2-DCB)) using CO_2 as a super critical fluid (SCF) is described for low lipid content fresh and sea water fish samples irradiated upto 8 kGy. The presence of 2-DCB was confirmed in all irradiated fish samples at all doses. SCF extraction is proposed as an alternative procedure to the florisil chromatography method currently in use and has the added advantage of a considerably shorter extraction time. SRA

1156

Shojaei (AH). **Cracker from kilka.** *Fishery Technology* 35(2); 1998; 90-94

Experiments were conducted to develop a method for the production of fish crackers (keropok popular snack food in Malayasia, Thailand, Indonesia and other Asian countries) from kilka (*Clupeonella*) by suitably modifying the sausage production technology. Seventeen formulations with varying amounts of ingredients (fish, flour, starch, ice, egg, oil, sugar and salt) were tried initially and a formula that was found to be the best was selected. The fish to flour ratio in the selected formula was optimised so that a product of max. linear expansion, crispness and best sensory qualities was obtained. Crackers prepared by using 50% fish and 50% flour was more acceptable and had a shelf-life of 4 months at room temp. SRA

1157

Srinivasa Gopal (TK), Iyer (TSG), Balachandran (KK), Madhavan (P), Vijayan (PK), Ravishankar (CN). **Ready-to-eat fish curry in flexible packs.** *Seafood Export Journal* 30(1); 1999; 7

The Central Institute of Fishery Technology (CIFT) Cochin, Kerala, India has sucessfully developed a fish curry packed in flexible pouches. The three-layer configuration of flexible pouches can perform the packaging function as equally well as metal cans. The retortable flexible pouch is based on polyester/Al. foil/cast polypropylene. The process for the production of fish curry has been standardized and the curry processed can be stored for more than a year at room temp. BV

1158

Hassan (F) and Mathew (S). **A protein-rich base material for value-added products from low-cost fishes.** *Seafood Export Journal* 30(1); 1999; 3-5

1159

Unnithan (GR), Kesavan Nair (AK), Krishna Iyer (HK) and Annawalai (V). **Capacity utilization in the fish processing plants in Kerala.** *Fishery Technology* 35(2); 1998; 120-126

Production and capacity utilization (CU) in the fish processing plants in Kerala state, India, were estimated using stratified random sampling procedure. The CU for 1996 was estimated to be 15% based on 365 working days with 3 shifts/day. During trawl-ban period (June and July), the processing industry was adversely affected (10.6% utilization) and during post-ban period (August-October) utilization substantially increased (25%). The increase was due to the increased production of squids, cuttlefish and other diversified products. The reason for the low CU was that the availability of raw material was not to commensurate with existing installed capacity in the fish processing sector in the ate. AA

1160

Careche (M) and Borderias (AJ). **Quality control of frozen fish using rheological techniques.** *Trends in Food Science and Technology* 9(6); 1998; 223-229

Reviews the methods of examining the mechanical properties of fish muscle; and the most appropriate approaches for quality conrol of frozen fish; fish muscle undergoes changes in mechanical properties during frozen storage due to chemical changes, such as oxidation, resulting in denaturation and aggregation of the myofibrillar proteins. Methods like tension analysis, compression analysis and texture-profile analysis (TPA) were used to measure the textural quality of the frozen fish and correlated with sensory analysis. 64 references. GS

Hakes

1161

Huidobro (A), Alvarez (C) and Tejada (M). **Hake muscle altered by frozen storage as affected by added ingredients.** *Journal of Food Science* 63(4); 1998; 638-643

The effect of three ingredients (triphosphate, lecithin and sucrose ester) on functionality and extractability of hake muscle proteins that had been intensely aggregated by frozen storage was investigated. Muscle proteins were extracted in 0.6 M NaCl, 2% sodium dodecyl sulphate (SDS) and 2% SDS + 5% β-mercaptoethanol (ME). Treatment with the added ingredients increased the amount of protein extracted when secondary interactions were broken with SDS. The same effect, although less pronounced, was found in the lots treated with triphosphate and sucrose ester when electrostatic bonds were broken with NaCl. The amphipathic ingredients (lecithin and sucrose ester) increased the amount of protein linked by nondisulphide covalent bonds. AA

Mackerels

1162

Venugopal (V), Doke (SN) and Thomas (P). **Viscosity and stability of structural proteins of irradiated Indian mackerel.** *Journal of Food Science* 63(4); 1998; 648-651

Fresh Indian mackerel (*Rastrelliger kanagurta*) was exposed to γ-radiation at dosages of 0, 1.5 and 3 kGy. The meat was collected and subjected to a four step washing treatment. Homogenates of the washed meat in cold (< 10°C) water exhibited apparent viscosity, which was dependent upon protein concn. Warming the homogenate to 45°C or reduction of its pH to 3.5 by acetic acid decreased the viscosity. Proteins in the low-viscosity dispersion were stable to heating at 100°C while incorporation of NaCl at 5 mM prior to heating resulted in protein precipitation. γ-Irradiation did not affect the viscosity, solubility or stability of the muscle proteins in water. AA

1163

Jiang (S-T), Ho (M-L), Jiang (S-H), Lo (L) and Chen (H-C). **Colour and quality of mackerel surimi as affected by alkaline washing and ozonation.** *Journal of Food Science* 63(4); 1998; 652-655

Rohu

1164

Rao (SB). **Changes in rohu (*Labeo rohita*) actomyosin during frozen storage: protein denaturation or coagulation.** *Fishery Technology* 35(2); 1998; 80-83

Changes in solubility, Ca^{2+} ATPase activity and Mg^{2+} ATPase activity during frozen storage of rohu actomyosin at -20°C for 10 wk. were studied. The biological activity of actomyosin as measured by Ca^{2+} and Mg^{2+}ATPase activity decreased during frozen storage and values were of 1.5% and negative resp. when compared to the original unfrozen freshly prepared rohu actomyosin, after 10 wk at -20°C. The irreversible loss of solubility and

Ca^{2+} and Mg^{2+} ATPase activities indicate that an irreversible aggregation of proteins, probably through covalent disulphide bonds is taking place during frozen storage and this is suggestive of protein coagulation as distinct from denaturation. SRA

Salmon

1165

Kim (J), Du (W-X), Otwell (WS), Marshall (MR) and Wei (C-I). **Nutrients in salmon and red grouper fillets as affected by chlorine dioxide (ClO_2) treatment.** *Journal of Food Science* 63(4); 1998; 629-633

The effect of ClO_2 treatment on nutrients of seafood was studied using Atlantic salmon (*Salmo salar*) and red grouper (*Epinephelus morio*) with five vol. (1:5, w/v) of aqueous ClO_2 at 20, 40, 100 and 200 ppm ClO_2 in 3.5% brine for 5 min. Compared to nontreated controls, treatment of salmon and red grouper with ClO_2 sol. in brine did not significantly change the contents of protein, fat, moisture, niacin, Ca, Fe, P or K. However, such treatment with brine or ClO_2 sol. in brine caused a significant reduction in thiamin content in both sp., but only riboflavin was reduced significantly in red grouper, possibly due to the solubilization effect of salt on the vitamins. AA

1166

Wang (D), Tang (J), Correia (LR) and Gill (TA). **Postmortem changes of cultivated Atlantic salmon and their effects on salt uptake.** *Journal of Food Science* 63(4); 1998; 634-637

Tuna

1167

Silva (CCG), Ponte (DJBD) and Dapkevicius (MLNE). **Storage temperature effect on histamine formation in big eye tuna and skipjack.** *Journal of Food Science* 63(4); 1998; 644-647

Notable histamine formation (> 30 mg/100 g) was detected in big eye tuna (*Thunnus obesus*) and skipjack (*Katsuwonus pelamis*) captured in Azorean waters and stored for 1, 3 and 6 days at 22, 10 and 4°C, resp. Higher levels ($P < 0.05$) of histamine were produced by skipjack reflecting its higher histidine content. Measurements of pH or volatile basic nitrogen were not adequate for estimating the extent of histamine-related health hazard. Counts of histamine-forming bacteria increased during storage at 4 and 10°C, and histamine formation was suppressed at 4°C. Storage temp. and histidine content were the main factors controlling histamine levels in tuna. AA

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Wines

1168

Agu (RC), Okenchi (MU), Ude (CM), Onyia (AL), Onwumelu (AH), Ajiwe (VIE). **Fermentation kinetic studies of Nigerian palm wines-*Elaeis guineensis* and *Raphia hookeri* for preservation by bottling.** *Journal of Food Science and Technology (India)* 36(3); 1999; 205-209

Fermentation kinetic studies of 2 Nigerian palm wines-*Elaeis guineensis* and *Raphia hookeri* showed that gas evolution, used as the fermentation rate index, was continuous throughout the fermentation experiment due to heavy microbial growth in the fermenting broths. Both *Elaeis* and *Raphia* wine fermentations followed a similar first-order kinetics. *Elaeis* wine fermentation was more vigorous, having a fermentation rate constant 3 times that of *Raphia* wine. *Elaeis* wines from different sources showed slight variations in their fermentation rates. The unsterilized sap fermented faster and produced higher levels of alcohol than sterilized *Elaeis* sap inoculated with yeast, *Saccharomyces cerevisiae*. Sterilization of the sap followed by yeast inoculation did not prevent explosion after bottling of fermented wine. The sterilization of the sap, followed by pasteurization of fermented wine was more effectivein controlling explosion during the bottling of palm wine. However, the sterilization process changed the appetizing whitish colour of palm wine to a dull brownish colour. AA

1169

Suturovic (ZJ) and Marjanovic (NJ). **Determination of zinc, cadmium, lead and copper in wines by potentiometric stripping analysis.** *Die Nahrung* 42(1); 1998; 36-38

A method for detn. of Zn, Cd, Pb and Cu in wines by means of potentiometric stripping analysis (PSA) is described. Cd, Pb and Cu are determined directly, whereas the Zn detn. is possible only after the wine samples decomposition. The results for five red and white Yugoslav wines are given. The contents of Zn, Cd, Pb and Cu in analyzed samples were in the range of 0.16-0.79 0.010-0.045, 0.13-0.27 and 0.10-0.46 mg/l, resp. The contents of the all analyzed metals were below the max. ordered by the Yugoslav law. AA

Non-alcoholic beverages

Fruit juices

Apple juice

1170

Su (SK) and Wiley (RC). **Changes in apple juice flavour compounds during processing.** *Journal of Food Science* 63(4); 1998; 688-691

Guava juice

1171

Yen (G-C) and Lin (H-T). **Effects of high pressure and heat treatment on pectic substances and related characteristics in guava juice.** *Journal of Food Science* 63(4); 1998; 684-687

Pomegranate juice

1172

Rege (AR) and Pai (JS). **Development of thermal process for clarified pomegranate (*Punica granatum*) juice.** *Journal of Food Science and Technology (India)* 36(3); 1999; 261-263

D value (thermal resistance) of *Aspergillus niger* NCIM 595 spores, in clarified pomegranate juice at 76.7°C was 5.4 sec. Process time required for pasteurization of the juice $F^{15}_{76.7}$ = 33 sec (corresponding to 6D) was adequate to render the juice free of *Lactobacilli* and *Aspergillus*. Degradation of juice colour of heating at various temp. was examined. Results indicated that the colour of the juice was fairly stable, except, for slight losses during heating at 80°C for 30 min. The thermal process developed resulted in an acceptable juice with respect to colour and flavour. AA

Strawberry juice

1173

Golaszewski (R), Sims (CA), O'Keefe (SF), Braddock (RJ) and Littell (RC). **Sensory attributes and volatile components of stored strawberry juice.** *Journal of Food Science* 63(4); 1998; 734-738

Juices from 3 cvs. were stored at 2°C and 25°C for 6 wk. and evaluated for the sensory attributes fresh strawberry, strawberry-jam, off-flavour, green and sweet. Fresh flavour declined while off-flavour increased during storage, with the largest changes occurring at 25°C. Juice colour and ascorbic acid also degraded much faster at 25°C. Fifteen volatiles were measured using headspace solid phase microextraction and GC. 2,5-Dimethyl-4-hydroxy-3(2H)-furanone and 2,5-dimethyl-4-methoxy-3(2H)-furanone were positively related to fresh flavour and negatively related to off-flavour, while -terpineol was inversely related to fresh flavour. These volatiles explained almost 90% of the variation for fresh and off-flavour attributes. AA

Tea

1174

Owuor (PO) and Obanda (M). **Influence of oxygen atmosphere during fermentation on plain black tea quality.** *Tropical Science* 38(3); 1998; 165-170

Enriching the atm. of fermenting 'dhool' (macerated leaf) with oxygen leads to faster production of plain black tea quality parameters. The theaflavin and soluble thearubigin levels reach their max. levels after shorter fermentation than under ambient air. However, the possible max. productions of the theaflavins and soluble thearubigins do not change due to use of enriched O_2. Other plain black tea quality parameters also reach high levels after short fermentation durations under enriched O_2 atm. The use of enriched O_2 atm. can only lead to higher costs of production without improvement in quality. AA

1175

Ahmad (N) and Mukhtar (H). **Green tea polyphenols and cancer: Biologic mechanisms and practical implications.** *Nutrition Reviews* 57(3); 1999; 78-83

Aspects considered in this review include: polyphenols and cancer, history, consumption and chemistry of tea, green tea and cancer chemoprevention and mechanisms associated with the biologic effects of green tea. 41 references. BV

FATS AND OILS

1176

Shahidi (F) and Wanasundara (UN). **ω-3 Fatty acid concentrates: Nutritional aspects and production technologies.** *Trends in Food Science and Technology* 9(6); 1998; 230-240

Reviews the nutritional aspects and methodologies used for producing ω-3 fatty acid conc. an important poly unsaturated fatty acid (PUFA). Some of the ω3 acids derived from seafood sources are eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and dosahexaenoic acid (DHA). ω3 fatty acid deficiency may cause cardiovascular diseases, hypertension, inflammatory and autoimmune conditions, depression and neurological conditions. Methods for commercial production of ω3-PUFA conc. include adsorption chromatography, mol. distillation, selective enzymatic hydrolysis of lipids, low-temp. crystallization, super critical fluid extraction and urea complexation of fatty acids. 98 references. GS

Fats

Mayonnaise

1177

Khalil (AH) and Mansour (EH). **Alginate encapsulated bifidobacteria survival in mayonnaise.** *Journal of Food Science* 63(4); 1998; 702-705

Oils

1178

Chakrabarty (MM). **Edible oil shortage in India and agriculture's crucial role in meeting it.** *Science and Culture* 64(11/12); 1998; 237-240

India has the largest oil economy in the world after U.S.A. and China with the production of about 25 million tonnes of oilseeds during 1996-97 which doubled in a span of 10 yrs. India accounts for 9.7% of the global oilseed production, 8.7% of protein materials and 9.2% of oilmeal exports. However due to rising population, the country's self sufficency level has reduced to < 80% and accelerated edible oil imports to a record 1.7 million tonnes during 1996-97. Edible oil consumption demand indicated that the 9th Five Year Plan target of 28% more oilseed output would be absolutely inadequate to meet indigenous requirement. Better oilseed processing technologies and modernisation of industry are recommended to meet the situation. GS

1179

Edris (AE). **Preparation and stability of a protein stabilized orange oil-in-water emulsion.** *Die Nahrung* 42(1); 1998; 19-22

Flavours are an important category of additives which have been used extensively in many industries. Essential oils are highly conc. flavours so they must be diluted before application in order to facilitate handling and to guarantee an equal distribution of flavour among the product. Most essential oils have low solubility in water due to their partial hydrophobic nature. The other alternative is to solubilize them in an organic solvent. These solvents are either expensive or prohibited for religious purposes. The most acceptable sol. is to emulsify the essential oils in water, in the form of tiny particles to form essential oil-in-water emulsion. The present study was dedicated to apply a derivative of milk protein (sodium caseinate) to stabilize orange oil emulsions. The change in particle size and the rate of emulsion creaming was investigated at different caseinate concn. and at different temp. The results obtained from this study revealed that sodium caseinate can be used, to a great extent, to stabilize orange oil emulsions. The av. particle size of the emulsion was 0.29 μm and 0.40 μm as determined by the laser light diffraction instrument and the image analysis technique, resp. The emulsion was stable for 100 days at 4°C for all caseinate concn. (30%, 15% and 5% w/w on orange oil basis). AA

1180

Kolanowski (W), Swiderski (F) and Berger (S). **Possibilities of fish oil application for food products enrichment with ω-3 PUFA.** *International*

Journal of Food Sciences and Nutrition 50(1); 1999; 39-49

This study was conducted to explore the possibility of selected food products enrichment with ω-3 PUFA, using fish oil preparations in liquid (30% eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)) and powder-micro-encapsulated (10%) form, without significant taste deterioration of the enriched foods. It was found that food product palatability was affected very differently by enrichment. The highest inclusion level was obtained in the case of instant powder-milk-based formulae conc. (upto 18% that provided 1.8% EPA, DHA), fats (upto 1.5% that provided 0.5% EPA, DHA), and products of high sweetness and flavours intensity, that mask unpleasant fishy taste and odour. Enriched salad oil retained good quality during 4 months of storage. Shelf-life prolongation of low pH, water-based products (fruit beverages), requires additional technological treatment to decrease oxidation. Enrichment at significant level (upto 0.1% that provides 0.03% EPA, DHA) of low-flavours intensity products (milk, vegetable juice), strongly decreases their palatability. Frequent consumption of food products enriched at sensory acceptable levels may considerably increase EPA and DHA amount in the diet, improving its nutritional quality. SRA

1181

Murray (M), Rooney (D), Neikerk (MV), Montenegro (A) and Weatherley (LR). **Immobilization of lipase onto lipophilic polymer particles and application to oil hydrolysis.** *Process Biochemistry* 32(6); 1997; 479-486

The immobilization of lipase onto two lipophilic particulate supports, non-porous polystyrene latex and porous Accurel EP400 powder, for the enzymic hydrolysis of sunflower oil is described. The activity of the immobilized enzyme was compared to that in free enzyme hydrolyses and the immobilization efficiency of lipase on each of the supports determined. Results indicated that, although polystyrene latex exhibited a very high affinity for the adsorption of lipase, enzyme activities were very poor. Satisfactory immobilization of lipase onto EP400 particles was attained only at high enzyme loadings. However, under these conditions, rates of hydrolysis and equilibrium conversions obtained using lipase immobilized onto EP400 particles were comparable to those achieved in free enzyme systems. In addition, once bound to the EP400 support, the enzyme displayed good recycle potential. AA

Palm oils

1182

Iwuoha (CI) and Agunanne (CL). **Effect of acid activation of locally available adsorbents for refining palm kernel oil.** *Journal of Food Science and Technology (India)* 36(3); 1999; 217-221

Crude palm kernel oil (PKO) was refined using 3 locally available adsorbents [clay, palm kernel shell charcoal (PSC) and wood charcoal (WDC)] activated with 3 inorganic acids (HCl, H_2SO_4 and H_3PO_4). In their natural state, WDC adsorbed relatively the best, while PSC was the least. HCl activation gave the best, while H_3PO_4 activation gave the least adsorption in clay, which was not significant (colour reduction, $P = 0.05$). Among the charcoals, H_3PO_4-activated WDC exhibited the best bleaching power. The performance was directly related to the reagent's strength for H_3PO_4, while H_2SO_4 and HCl showed inverse trends. The overall quality of the refined PKO compared favourably with the samples bleached with commercial adsorbents. AA

1183

Low (K-S), Lee (C-K) and Kong (L-Y). **Decolorisation of crude palm oil by acid-activated spent bleaching earth.** *Journal of Chemical Technology and Biotechnology* 72(1); 1998; 67-73

Regeneration of spent bleaching earth by acid activation and heat treatment has been investigated. Spent bleaching earth was activated by H_2SO_4 of various concn. (1-40% and heat treated at 120°C-350°C. The experimental results indicate that treatment of spent bleaching earth with 10% H_2SO_4 at 350°C produced a material which was most effective in removing coloured pigments from crude palm oil. Subsequent experiments were conducted using this particular acid-treated spent bleaching earth. Various parameters which affect the sorption process were studied. They include initial crude palm oil concn., sorbent dosage and temp. Applicability of both the Freundlich and Langmuir isotherms to the acid-treated spent bleaching earth-palm oil hexane miscella system indicates that both physiosorption and chemisorption were involved in the sorption process. Measurements of

various quality parameters of bleached and crude palm oils were carried out. They include Lovibond Colour index, carotene content, peroxide value, free fatty acid, fatty acid composition and iodine value. The results show that the bleached palm oil retained good oil quality after the decolorisation process using 10% acid-treated spent bleaching earth with a Lovibond Colour of 6.4. AA

Sunflower oils

1184

Raghav (PK), Grover (PC) and Thaper (VK). **Storage stability of sunflower (*Helianthus annus*) oil in different packaging materials.** *Journal of Food Science and Technology (India)* 36(3); 1999; 253-255

Studies on storage of raw sunflower oil were carried out in 4 different packaging materials viz., plastic, tin, hindolium and HDPE pouches. The effect of heat treatment on storability of oil under airtight and non-airtight conditions was also studied. In case of heat treatment, the oil was heated upto 120°C temp. for 90 min in order to inactivate the lipase enzyme completely. It was observed that during storage, different packaging materials and heat treatment affected the colour, odour, free fatty acids and iodine value of oil. The airtight HDPE pouches (120 gauge) with heat-treated oil were found to be the best packaging materials for storage of oil upto a period of 16 wks. AA

SPICES AND CONDIMENTS

Spices

1185

Meenakshi Singh, Balasubrahmanyam (N), Abraham (KO), Raghavan (B) and Shankaranarayana (ML). **Changes in volatile acid contents of *pulao masala* mix on storage.** *Indian Food Packer* 52(5); 1998; 16-21

The changes in major flavour compounds during storage of *pulao mix*, based on ground spice, extractives diluted with starch and encapsulated powder and packed in polypropylene double pouch (PDP) and Al. foil laminate and stored at 90% RH, 38°C were studied. The changes in the volatile oil content in stabilised *pulao mix*, packed in Al. foil laminate was negligible as compared to ground *pulao mix* and extractives diluted with starch at the end of 180 days storage irrespective of storage conditions. The stabilised *pulao mix* has very good storage stability, even under accelerated condition when packed in Al. foil laminate pack. The loss in flavour in the case of encapsulated spice *pulao mix* was min. (3%) in Al. foil laminate pouch at 65% RH/ 27°C and the same was 9.7% at 90% RH/ 37°C. However, the loss was quite high (57.7%) in the extractives plated on corn starch. The loss of flavour was much more in all the samples packed in PDP irrespective of the storage conditions. Based on the sensory and storage studies, a *pulao mix* with stabilised flavour was developed by judicious blending of ground spices and encapsulated spice oils. AA

1186

Joseph (D), Lal (M), Bajpai (HN) and Mathur (PK). **Levels of trace elements of few Indian spices by energy dispersive X-ray fluorescence (EDXRF) method.** *Journal of Food Science and Technology (India)* 36(3); 1999; 264-265

Concn. of K, Ca, Mn, Fe, Cu, Zn, Rb (rubidium) and Sr (strontium) were determined in Indian spices namely, pepper, clove, cardamom, cinnamon and cumin by Radioisotope excited Energy Dispersive X-ray Fluoresence method. The levels of K and Ca were highest in cinnamon and cumin and that of Mn was highest in clove and cinnamon. Rb and Sr were found in all spices except cinnamon. Chromium and titanium were found only in pepper. The level of toxicity and the significance of the above trace elements in the human diet are discussed. AA

Essential oils

1187

Lawrence (BM). **Progress in essential oils.** *Perfumer and Flavourist* 23(3); 1998; 63-66, 68, 70, 72, 74, 76, 78, 80, 82

Essential oils covered in this article are Pennyroyal oil, Wild thyme oil, Kewda or Keora oil, and Citronella oil. Comparative chemical composition (%) of these oils are tabulated. SRA

1188

Lawrence (BM). **Progress in essential oils.** *Perfumer and Flavourist* 24(1); 1999; 53-63

Essential oils covered in this article are: boronia extract, geranium oil, vassoura oil bois-de-rose oil. Comparative percentage composition of these oils are tabulated. SRA

1189

Mosciano (G). **Organoleptic characteristics of flavour materials.** *Perfumer and Flavourist* 24(1); 1999; 13-15

This is a series of articles reporting on reviews of flavour materials. Acerola powder, chile arbol oleoresin, chile guarillo oleoresin, cocoa extract 71/00101 A, cocoa extract 71-0053, Gistex XII, grapefruit whole extract 6 fold, hops oil, limp CP 5 fold whole fruit, maxarome, menthone fractions Nat.ex buchu oil, mesquite wood extract, oil lime distilled 4 fold WONF 5106/15, olibanum oil, orange extract whole fruit 6 fold, peanut extract natural, peppermint oil natural # 97981, spearmint oil 80% carvone, spearmint oil natural (97983), thiocineol are the flavour materials covered. SRA

Flavourings

1190

Mosciano (G). **Organoleptic characteristics of flavour materials.** *Perfumer and Flavourist* 23(3); 1998; 55-57

This is a series of articles reporting on reviews of flavour materials. 2-Acetyl-3-ethylpyrazine, anisic aldehyde (natural), cherry essence sour 3000 fold, 2,4-decadienal (natural), 2-ethoxythiazole, C-2, T-4-ethyldecadienoate, ethylformate (natural), P-ethylphenol, ethylpropionate (natural), 2-ethylpyrazine, geranylacetate (natural), geranylphenylacetate, guaiacylacetate, Mate erva powder 8%, 1-P-menthene-8-thiol (natural), 2-methoxy-3-(methylpropyl)-pyrazine, O-methylanisole, 3-methyl-2-cyclohexene-1-one, trans-2-nonenal (natural), and phenylethyl isovalerate are the materials covered. SRA

SENSORY EVALUATION

Nil

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

1191

Nelson (GJ). **Dietary fat, *trans*- fatty acids, and risk of coronary heart disease.** *Nutrition Reviews* 56(8); 1998; 250-252

1192

Palozza (MDP). **Prooxidant actions of carotenoids in biologic systems.** *Nutrition Reviews* 56(9); 1998; 257-265

Reviews the available evidence of prooxidant activity of β-carotene and other carotenoids *in vitro* and *in vivo*, focusing on the main factors responsible for the induction of this oxidative activity and on the possible biologic consequences in human disease. 74 references. GS

1193

Holt (SHA), Delargy (HJ), Lawton (CL) and Blundell (JE). **The effects of high-carbohydrate vs high-fat breakfasts on feelings of fullness and alertness, and subsequent food intake.** *International Journal of Food Sicences and Nutrition* 50(1); 1999; 13-28

1194

Beare-Rogers (J), Ghafoorunissa, Korver (O), Rocquelin (G) and Sundram (K). **Dietary fat in developing countries.** *Food and Nutrition Bulletin* 19(3); 1998; 251-267

Describes the dietary fat consumed in developing countries particularly in Chili and India. Other aspects considered are fats and essential fatty acids in complementary foods for infants, saturated and *trans* fatty acids and fats and oils as sources of vitamin A and carotenoids. BV

1195

Suter (PM). **The effects of potassium, magnesium, calcium and fiber on risk of stroke.** *Nutrition Reviews* 57(3); 1999; 84-91

Reviews recent study on the beneficial effects of nutrients like K, Mg, Ca and fibre on blood pressure and regulatory functions in human beings. A high intake of these nutrients has been found to reduce stroke risk in men. A diet rich in fruits and vegetables is recommended to obtain these benefits. 35 references. GS

TOXICOLOGY

1196

Ford (RA). **The safety of nitromusks in fragrances: A review.** *Deutsche Lebensmittel-Rundschau* 94(6); 1998; 192-200

1197

Thielert (G) and Reusch (C). **Investigation of food and food products on contamination for fumonisins.** *Deutsche Lebensmittel-Rundschau* 94(5); 1998; 153-159 (De)

1198

Hemmerling (C), Augustyniak (B), Crone (B), Maye (A), Neumann (B), Risto (C), Seidl (G). **Residues of vinclozoline in plant foods: Fast determination of the total residue by GC-MS.** *Deutsche Lebensmittel-Rundschau* 94(7); 1998; 221-228 (De)

In an automatically working apparatus for SDE (steam-distillation-extraction) plant foods are hydrolysed by alkali to extract vinclozoline residues including metabolites content the 3,5-dichloroaniline group. The detn. was accomplished by GC-MS without other cleanup. The standard deviation for a sample of lettuce with 0.166 mg/kg vinclozoline by 5-times execution of the described procedure is 0.01. The variation coeff. is 1%. The recoveries of fortifications of 0.1 mg/kg were determinated with 100%, 118% or 99% for crushed grain, carrots and lettuce and with 60% for beans. Opposite to methods only registering non decomposed vinclozoline, residue levels increase considerably, in carrots pratically clearly about the legal limit. AA

FOOD LAWS AND REGULATIONS

1199

Stonlie (J), O'Flaherty (MJ) and Hare (K). **Food or supplement? Choosing the appropriate regulating path.** *Food Technology* 52(12); 1998; 62-67, 69

This article helps to sort through the regulatory intricacies of positioning a product as a conventional food vs. a dietary supplement. CSA

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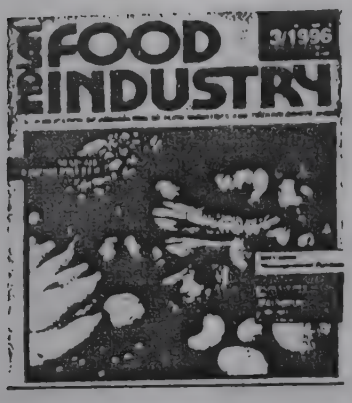

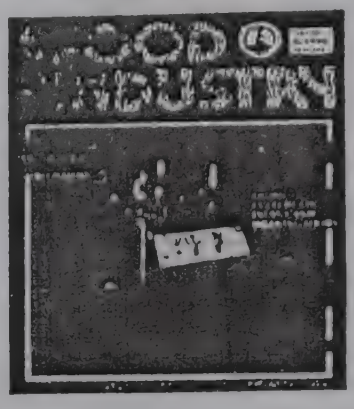

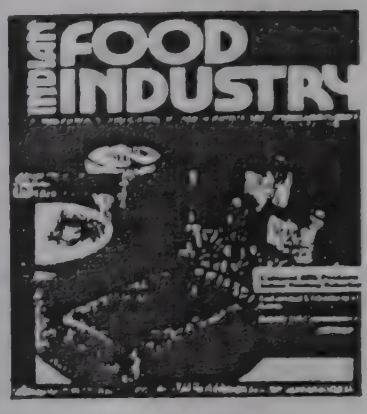

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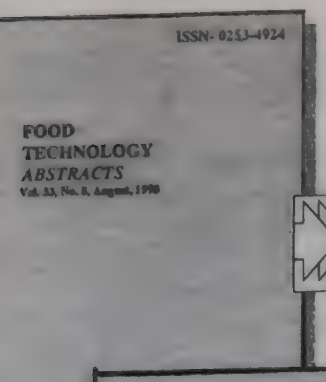

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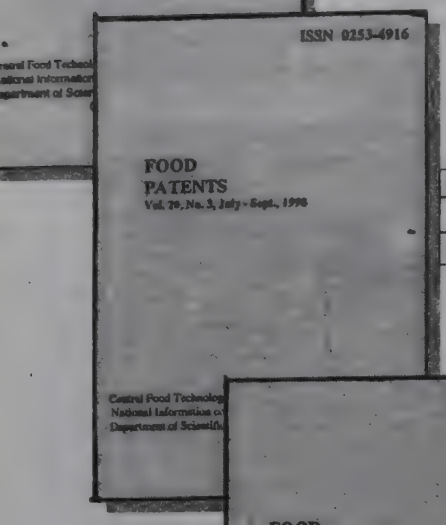

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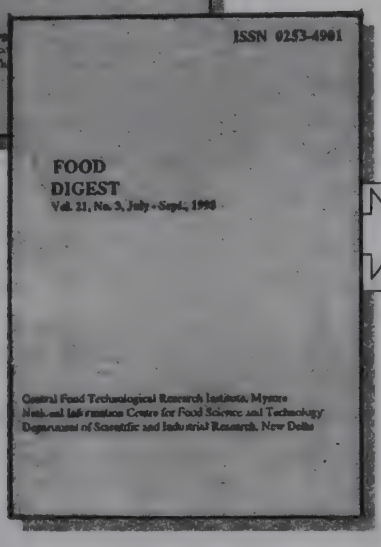

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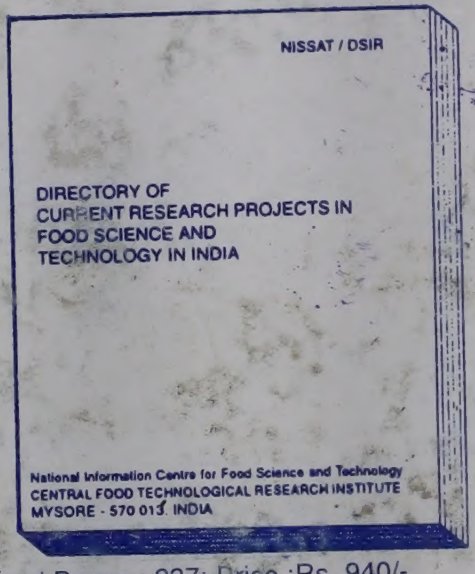
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